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THE PLANT DISEASE REPORTER

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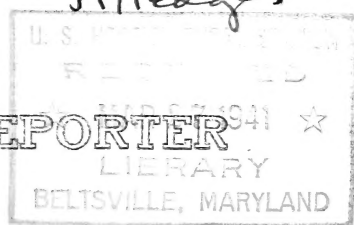
Diseases of Fruit and Nut Crops

In the United States in 1924

May 1, 1925

BUREAU OF PLANT INDUSTRY

UNITED STATES DEPARTMENT OF AGRICULTURE



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DISEASES OF FRUIT AND NUT CROPS IN THE UNITED STATES IN 1924

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Plant Disease Reporter
Supplement 39

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CONTENTS

Introduction	2	Other diseases	53
The disease situation in general ..	2	General references	54
Fruit diseases of 1924	3	Plum and prune	55
Diseases of pome fruits	3	Cherry	59
Apple	3	Apricot	63
Scab	3	Diseases of small fruits	64
Blotch	11	Grape	64
Bitter rot	14	Strawberry	70
Blackrot	16	Raspberry	73
Rust	19	Blackberry	81
Blister canker	22	Dewberry	83
Fireblight	23	Loganberry	84
Fruitspot	26	Wineberry	84
Bitter pit	27	Currant	84
Jonathan spot	28	Gooseberry	85
Crowngall	28	Mulberry	86
Sooty blotch and flyspeck ..	29	Cranberry	86
Powdery mildew	29	Blueberry and huckleberry	88
Brownrot	30	Dingleberry	89
Rootrots	31	Diseases of sub-tropical fruits ..	89
Frost injury	32	Citrus	89
Other diseases	33	Avocado	98
General references	34	Banana	98
Pear	37	Cherimoya	99
Quince	41	Date	99
Diseases of stone fruits	42	Fig	99
Peach	42	Guava	100
Brownrot	42	Loquat	100
Leafcurl	44	Mango	101
Scab	46	Papaya	101
Bacterial spot	47	Persimmon	101
Rust	49	Pineapple	101
Blight	50	Pomegranate	102
Yellows	50	Diseases of nuts	102
Rosette	51	Pecan	102
Little peach	51	English walnut	104
Spray injury	51	Coconut	104
Weather injury	52		

INTRODUCTION

The work of the Plant Disease Survey is of great and increasing value to every person engaged in plant pathological investigations. During the short time that the author was present in the Plant Disease Survey office, the records there were consulted by a number of men, and some of them, including at least one representative of a great industrial firm, were asking for temporary desk space so that they might spend a day or more in detailed study of the diseases of certain hosts, or certain groups of diseases.

This statement may seem out of place here but it is mentioned to call your attention to the fact that state men, United States Department of Agriculture men, and men in the employ of important industrial development, are appreciating the value of the records which the Plant Disease Survey is accumulating and classifying.

Another reason for mentioning it here is to point out that such men are asking why there are not more data concerning certain diseases, why some states do not send in reports, and whether we cannot improve the records somewhat. Opinions concerning collaborators will be formed from the data which they have furnished or failed to furnish.

During the next few years there is going to be a tremendous increase in the use of the records of the Plant Disease Survey office and everyone of us (collaborators) who does his best to turn in accurate and valuable data, will be amply repaid in more ways than one.

Of course, it is understood that plant disease problems are of more importance in some states than others, and that the facilities and funds are inadequate for much plant disease survey work in most of the states. That phase of the problem is one which we must keep in mind, but in the meantime we can all do our best with the facilities that are available.

THE DISEASE SITUATION IN GENERAL

There seems to have been very little injury from fungous diseases in the Pacific Coast States. This is undoubtedly due to the long continued dry weather from which that region has been suffering. The Eastern States had an unusual amount of rain during the late spring of 1924 which resulted in a very heavy infection of scab and rust on apple. Fire blight of apple was not particularly severe and it is believed that this is at least in part due to the cold, wet weather, which interfered with insect activities during the early part of the growing season. Bitter rot of apple and peach brown rot were less serious than usual, apparently correlated with dry weather during late June, July, and August.

The finding of apple blotch in New York is a matter of considerable interest, and it is more than likely that infected nursery stock has been shipped into many of the northern states.

SOME OF THE NEW, OR NOTEWORTHY DISEASES REPORTED DURING 1924
(See general part of report for more specific data)

*Tranzschelia punctata on Prunus serotina from Missouri.
Cercospora mali - on apple from Mississippi.

- Coniothyrium (probably C. pirinum) - Associated with a fruit spot on apple from Illinois.
- Phoma pomi - On apple leaves from New Jersey.
- Bacillus amylovorus - On plum in Ohio and South Dakota.
- Rhytisma vitis - On grape from New York.
- * Gloeosporium rufomaculans - Causing a severe rot on nearly mature peaches in Florida.
- Cuscuta sp. - On raspberry from Wisconsin.
- Leather rot of strawberry, caused by Phytophthora cactorum - Reported from Kentucky, Tennessee, Louisiana, Arkansas, Missouri, and Illinois.
- * Sclerotinia vaccinii-corymbosi - On blueberry from Indiana.
- Fusarium sp. (cubense ?) - Causing wilt of banana in Florida.
- Phytophthora faberi - On coconut in Florida associated with bud rot.
- Measles - On pear from Florida.
- * Specimens accompanied report.

FRUIT DISEASES OF 1924

DISEASES OF POME FRUITS

APPLE

SCAB CAUSED BY VENTURIA INAEQUALIS (CKE.) ADERH.

Distribution and relative prevalence

The apple scab was very widespread in 1924 and the total amount of injury is given as greater than any year for which we have records, except 1922. The damage was greatest in the states bordering the Great Lakes; those in the Appalachian Mountain section, and the Middle Atlantic states. Orton (Pennsylvania) says "One of the worst years in history." Thurston on May 15 reports 80% fruit infection and 100% leaf infection in Adams and Cumberland Counties, Pennsylvania. Jehle says that in Maryland

"This year it appeared in unusually severe form. ** The affected parts were dwarfed and curled, giving the tree an abnormal appearance which was not recognized as scab by several orchardists but was mistaken for spray burn, blight, and other troubles. On the trees which were most severely injured, all of the young fruit dropped and a large portion of this loss was undoubtedly due to the presence of the disease. Later many of the infected leaves dropped and many of the twigs and fruit spurs died."

Hesler reports,

"Scab is especially heavy on fruit in eastern Tennessee this year.

Apple - Scab

Usually leaf scab is rare in this state, but this year it is very abundant, dwarfing and deforming the leaves."

Giddings and Sherwood state,

"In some orchards in West Virginia there is more scab than we have ever seen before. There is already (June 24) serious defoliation in unsprayed or poorly sprayed orchards of susceptible varieties."

The leaf injury in some West Virginia orchards was so severe that it was reported to the Experiment Station as sun scald, spray burn, and blight. Such injury was found on some trees which were said not to have been sprayed. In other cases it may have been spray burn following scab as has been noted in previous years. Fromme in Virginia states that it was one of the worst seasons for apple scab in his experience and that unsprayed trees showed 100% infection. The disease was reported as causing very little injury in the Pacific Coast states. The infection was also indicated as slight in northern Vermont and New Hampshire. Lutman says that almost complete absence of scab in northern Vermont is noted as very unusual.

The only states from which no reports of scab were received are Oregon, Nevada, Arizona, Utah, Wyoming, Montana, Florida, Texas, and Oklahoma although it is probable that scab occurred in some or all of them.

Economic importance and losses

As already indicated the great amount of injury resulted in serious losses. Adams cites scab as the limiting factor for clean fruit in Delaware. Guba, giving reports for various counties in New York state, says, "A grade fruit cut down 70% by apple scab in Genesee County. Very serious in well sprayed orchards; leaf count showed 10% or more scabby leaves."

Table 1. Estimated losses from scab, as reported by collaborators, 1924.

Percentage: loss	States reporting	Percentage: loss	States reporting
20	: New York, Kentucky	4.5	: South Dakota
18	: Virginia	4	: Indiana
15	: Pennsylvania, Wisconsin	3.5	: Maryland
12.5	: Michigan	3	: Vermont, Connecticut
12	: New Jersey		: Minnesota
10.5	: Ohio	2.5	: Illinois
10	: Delaware, Iowa	2	: Alabama, New Mexico
7	: North Carolina	1.5	: Kansas
6	: West Virginia, Georgia	1	: New Hampshire, North
5	: Nebraska		: Dakota, South Carolina
:	:	:	:

Table 2. Development of fungus, date of observed infection and development of host.

State	Ascospores:		Infection:		County of		Development of apple trees			
	mature	discharge	first	observed	first	observation	Delayed	Propink	Pink	Calyx
	in field:						dormant			
Me.	May 13	May 13	June 12				May 10	May 19	May 30	June 13
N. H.	April 8		June 4		Hillsborough:					
Vt.		May 13								
Mass.		April 30	May 30							
Conn.			May 27		New Haven					
N. Y.			May 20		Dutchess		Apr. 29- May 5	May 12-15	May 21-26	June 2-5
N. J.			May 15		Atlantic					
Pa.			May 15		Adams					
Del.			May 3		Sussex		April 8	April 23	May 1	
Va.		April 18	May 9							
W. Va.		April 19	May 7				April 19		April 30	May 12
Tenn.			May							
N. C.			June 28		Mecklenburg					
S. C.			Sept. 23		Anderson					
Miss.			July 30		Lee					
Ohio	March 31	April 9	May 7		Butler		April 21		May 3	
Ind.			June 11		Montgomery					
Ill.			May 6		Johnson					
Mich.	April 28	May 12								
Wis.	March 14	May 6	May 15		Dane				May 16	
Minn.		April 22	May 4		Washington					
Iowa			May 20		Story					
S. Dak.			June		Brookings					
N. Mex.			Aug. 15		Chaves					

Weather relations

The 1924 season seems to have been particularly favorable for apple scab development throughout the eastern United States. In certain sections, particularly in the New England area, there was dry weather occurring soon enough to check later scab development. Clinton (Connecticut) says, "Threatened early to be very bad but dry weather checked further spread." Tyler, reporting from Nassau County, New York, on August 11 stated that apple scab had had no chance to spread for six weeks past. Stokdyk (Kansas) states, "Dry season at ascospore discharge period held it in check." In the Pacific Coast states scab injury has been negligible and this is probably a result of unusually dry weather. Most sections of the eastern states did not benefit from dry weather until mid-season. Adams (Delaware) reports prolonged cool wet weather with twelve days of rain in April, seventeen in May, and fourteen in June. Fromme says that the disease was especially severe in the northern part of Virginia where over ten inches of rain fell in the month of May. Schneiderhan (5), reporting for northern Virginia, says, "Studies of incidence of scab on apple fruits during 1924 show three infection cycles during the early season, cessation of spread in the middle of the summer and renewed activity in the fall." He found (6) that, "Discharges of ascospores occurred only during rainfall and that the majority of rains within the period of discharge were accompanied by spore discharge." The following table gives the number of spore discharges of which he had records for the past three seasons.

Table 3. Periods of ascospore discharge according to Schneiderhan (6).

Number of <u>periods</u> in each month						: Total discharge : period (<u>days</u>)
Year	: April	: May	: June	: July	:	
1922	: 4	: 9	: 3	: 0	:	56
1923	: 1	: 4	: 5	: 3	:	94
1924	: 3	: 7	: 4	: 0	:	61

Giddings reports that in eastern West Virginia, "The weather was so wet that in many cases the spray hardly had time to dry before there was further rain." The disease was held in check by hot dry weather during the late summer in much of the eastern territory. There were, however, late rains which induced some infections which were developing as late as harvest time.

Varietal susceptibility

The following table gives a list of apple varieties the susceptibility of which was reported by collaborators during 1924. Some apparent discrepancies may be noted in this table but that is another indication of the fact that we do not have a sufficiently detailed knowledge of diseases and their host relations.

Table 4. Susceptibility of apple varieties to scab, 1924. (Reporters for the various states are as follows: Connecticut, Clinton; New York, Guba; New Jersey, Martin; Delaware, Adams; Kentucky, Valleau; Ohio, Hesler, Stover; Indiana, Gardner; Wisconsin, Vaughan; Minnesota, Department of Plant Pathology; New Mexico, Crawford.)

Variety	: States reporting	:: Variety	: States reporting
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Susceptible

Astrachan	: Connecticut	:: Newton Pippin	: New York
Baldwin	: Massachusetts	:: Northwestern	:
Ben Davis	: New York, New Jersey	:: Greening	: Wisconsin
Crabs	: Connecticut, Minnesota	:: Red Astrachan	: New Jersey
Delicious	: Kentucky, Indiana	:: Rhode Island	:
Dudley	: Wisconsin	:: Greening	: New York
Early Harvest	: Delaware	:: Rome Beauty	: New Jersey, Ohio,
Fall Pippin	: Connecticut, New York	::	: Indiana
Fameuse	: Wisconsin	:: Stark	: Delaware, Ohio
Jonathan	: New Mexico	:: Stayman	: Delaware, Kentucky,
McIntosh	: Massachusetts, Con-	::	: Indiana
	: necticut, New York,	:: Wealthy	: Minnesota
	: New Jersey, Ohio,	:: Winesap	: New Jersey, Delaware,
	: Wisconsin	::	: Kentucky

Medium to light

Baldwin	:	:: Pewaukee	:
Delicious	:	:: Porter	:
Gravenstein	:	:: Pound	:
Greening	: All reported by	:: Stagmore	: All reported by
King	: Connecticut	:: Wagener	: Connecticut
King David	:	:: Wealthy	:
Pearlman	:	::	:

More resistant

Greening	: Minnesota	:: Rome Beauty	: Kentucky
Grimes Golden	: Kentucky	::	:

Resistant

Black Ben	: Wisconsin	:: Yellow Trans-	:
Gano	: Wisconsin	:: parent	: New Jersey
Grimes Golden	: New Jersey	:: York Imperial	: New Jersey
Most crabs	: Wisconsin	::	:

Apple - Scab

Twig infection was reported from three states. Clinton says, "Have proved that scab carried over winter in Connecticut in the twigs of such susceptible varieties as Fall Pippin, McIntosh, and Greening in its *Fusicladium* stage and this method is as serious a menace as the asco stage on old leaves." Johle found infection upon twigs and fruit spurs in a Stayman and Stayman Winesap orchard in Maryland. Adams also reported twig infection in Delaware.

Osmun reports that susceptibility of Baldwin is unusual for Massachusetts. Martin reports that in one orchard in New Jersey Winesap was practically defoliated while Yellow Transparent, Grimes Golden, and York Imperial were only slightly affected. In another orchard he found heavy scab infection on Grimes, Ben Davis, and Red Astrachan. Grimes is usually considered resistant, but both Grimes and York have been reported authentically as susceptible in some previous years. It is particularly interesting to find Grimes showing such a striking difference in susceptibility in two orchards in the same small state.

Control:

A great deal of difficulty seems to have been experienced in efforts to control the apple scab during the 1924 season. This is partly due to the large amount of rainfall occurring during the period when the applications should have been made. Guba, reporting for New York, says, "After the delayed dormant period (April 29 to May 5) we had rain continuously up to May 20." From West Virginia it was reported that, "They tried to spray in some of the commercial orchards when the men had to wear rubber boots and waded through water."

Another important factor which interfered with satisfactory control in many cases was inadequate equipment. From the numerous reports bearing on this subject it would seem highly desirable to take up the question of adequate equipment as a matter of first consideration with the commercial apple growers. Martin reports one case in New Jersey in which an orchard was sprayed four times with a barrel sprayer but early and complete defoliation was observed on the McIntosh variety and heavy defoliation of the Winesap. In another orchard in the same locality sprayed on the same date but with a power sprayer no scab was found. Other instances of similar inefficient work are given. Jehle says that in Maryland, "No orchards have been observed which were free from a moderate amount of scab but the amount was less in orchards which were thoroughly sprayed at the proper time. In general, scab was controlled better where nozzles were used than with guns." Hesler reports an orchard which showed a loss of 2500 bushels on account of scab in 1922 and heavy infection in 1923, but in which the disease was well controlled by thorough and timely spraying with Bordeaux during 1924. Scab was generally very prevalent in the surrounding territory.

Reports concerning the use of dusts and sprays show considerable variation. Felsom reports from Maine, "Abundant infection on fruit in poorly sprayed commercial orchards. Lime-sulfur spraying with four or five applications beginning with the pink or prepink, or five sulfur-arsenic dustings beginning with the prepink, reduced scab percentages from 40 to 4. Control nearly complete in some sprayed and dusted commercial orchards and on sprayed and dusted experimental plots."

In New York some counties reported good results from the use of the dust and others did not. Virginia reported very poor control with dust. Fromme says, "In another orchard of Black Twig which received seven sprays and seven dusts under comparative conditions (the dust being applied according to the

Apple - Scab

advice of the dust salesman) there is only 5% of blemish-free fruit in the dusted block as compared with 95% in the sprayed block. The injury is chiefly due to scab." West Virginia also reported very poor scab control where sulfur dust was used.

The importance of timely applications was brought out very strongly by a large number of states. Guba says, "Pre-blossom application most important in eastern New York. Delayed dormant most important in western New York." Orton says, "All spraying experiments in Pennsylvania emphasized the importance of a prepink application this year. The delayed dormant was not apparently of much importance." Valleau (Kentucky) reports, "Considerable evidence that the prepink spray is necessary for control." McClintock (Tennessee) - "Much less serious where thorough pink bud spray was applied." H. C. Young (Ohio) - "Failure to control can be at least partially contributed to lack of timing of pre-blossom sprays." Gardner (Indiana) - "Sprays gave good control. Prepink necessary." Vaughan (Wisconsin) - "Prepink spray helped in scab control but was not applied early enough for complete control."

In this connection Keitt and Jones (3 & 4) (Wisconsin) report interesting data

"Ascospores were caught at intervals from May 6 to June 29 (apples bloomed June 2-18). The maximal occurrence of ascospores was recorded May 13, when during a rain they were caught through a four hour period at the average rate of 289 per cubic foot of air. The major portion of the season's discharge occurred before the blooming period. ** Infection began in very early stages of unfolding of cluster buds, about 20 days before the 'pink' spray was applied. ** Under extreme conditions one 'prepink' treatment may be insufficient."

It is very evident that in most states the extremely early spray applications were of the utmost importance in scab control.

K. M. Curtis (1), reporting upon work done in New Zealand, found that leaf burying assists materially in scab control, that leaf burning reduced the amount of initial infection by more than 50%, and that spraying the dead leaves under the trees at just about the date of ascospore discharge gave about 60% control of initial infections. This is an interesting feature in connection with the ordinary orchard spray program.

Spray and dust injuries were reported from several states. Bennett of Michigan says, "Leaf infection was especially abundant and spray injury following this has caused considerable damage." Whetzel (7) (New York) - "Severe foliage injury followed applications of spray or dust. copper or sulfur, made during hot weather on trees infected with scab (in 1923). ** No cases of this type of foliage injury due to dust application to scabby leaves had been noted prior to 1923, but in July numerous cases were observed, and in every instance the burning was associated with scabby foliage. The injury was in proportion to the amount of scabby foliage, not to the kind of spray or dust used."

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Apple - Blotch

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BLOTCH CAUSED BY PHYLLOSTICTA SOLITARIA ELL. & EV.

Geographic distribution

Apple blotch was reported from approximately the same range of territory as usual, but an interesting report was received from New York state. Thomas (2) found it upon seedling nursery stock at Williamson, New York. His report is as follows:

"In one count of 100 trees, 86 showed blotch cankers. Probably 40 to 50% of these were quite badly cankered. The buds on this stock were in the main, unsuccessful. To what extent the disease was responsible I could not ascertain. Most of the injury is on the first year wood but there had been some spread to the growth of the season of 1923. Another planting on the same farm of seedlings obtained from a nursery in Shenandoah, Iowa showed an occasional tree with blotch canker."

McClintock also reports that blotch is coming into Tennessee in large amounts on apple seedlings from Kansas. In view of the probable earlier shipments of infected stock into such an apple producing state as New York and the fact that the disease does not occur to any economic extent north of the 42nd parallel, it is a question whether climatic conditions are such as to favor its spread in the northern states. It is possible, on the other hand, that the disease has not as yet become well established in those states. Anderson and Tehon report that blotch infection was abundant in the southern part of Illinois and extended farther north than usual. In West Virginia and in Ohio the disease is reported to have been working gradually northward and to have become more severe farther north in those states in recent years. The question of varieties may also be important, and all possible data should be secured along these various lines so that we may better judge the probable further spread of this disease.

Relative prevalence

Only three states, West Virginia, Maryland, and New Jersey, reported more injury from blotch than in 1923. Ohio, Kentucky, Tennessee, Arkansas, and

Apple - Blotch

Variety	: States reporting	:: Variety	: States reporting
<u>Resistant</u>			
Delicious	: New Jersey, Kentucky	:: Winesap	: Kentucky
Rome Beauty	: New Jersey	:: York	: Kentucky
	:	::	:

Martin reports that fruit infection was observed in New Jersey on Rome Beauty, English Codling, Hagelaw, Baldwin, Winesap, Gravenstein, Grimes Golden, Stark, and Maiden Blush. He also mentions a case in which fruit infection on Maiden Blush trees was considerably more important on the side adjacent to some severely infected Smith Cider trees, indicating that the latter variety was carrying the infective material and that the Maiden Blush would probably not have suffered any serious injury if the trees had been planted by themselves or at some distance from the more susceptible variety. Sherwood states that Rome Beauty and Ben Davis showed considerable susceptibility in the southern part of West Virginia. These two varieties were reported susceptible in Kentucky also.

Gardner of Indiana reports fruit infection on Florence Crab, McIntosh, Springdale and McMahon. He also reports twig infection on the following varieties:

Hightop Sweet	McMahon	Tetofsky
Pease	Springdale	Summer Rambo
Milwaukee	Tolman	Red Astrachan
Baldwin	Early Harvest	Ralls
Florence Crab	Huntsman	Thaler
McIntosh	Domine	

Control

There seems to have been no difficulty in controlling blotch by reasonably careful and thorough spray applications. Gaba (1), reporting on work done in Illinois, says:

"The first blotch spray or what is very frequently termed the two-weeks spray in southern Illinois must be on the trees not later than two weeks after 75% of the blossoms have fallen. Lime sulfur and Bordeaux mixture are equally effective. For Dutchess and Yellow Transparent a two, three, four, and six weeks spray schedule is recommended and for Benoni a two, three, four, six, and eight weeks schedule."

Other reports concerning control are:

Ohio: It seems to be very easily controlled by most of the sprays. In one orchard where lime sulfur is used, blotch is under complete control. Colloidal sulfur is also controlling it. (Young)

Apple - Blotch

Kentucky: Very severe in uncared for orchards but generally controlled where proper sprays have been applied. (Valleau)

Tennessee: Held in check even on such susceptible varieties as Dutchess by thorough spraying with Bordeaux mixture. (McClintock)

Arkansas: Well controlled by thorough spraying. Few to 2% on well sprayed susceptible varieties. (Dept. Plant Path.)

Kansas: Excellent control in well sprayed orchards. Lime sulfur at petal fall gave good control of blotch. (Stokdyk)

Good control of apple blotch has also been secured by lime-sulfur sprays in commercial orchards in West Virginia. It is evident that timeliness and thoroughness as well as the material used are important.

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BITTER ROT CAUSED BY GLOMERELLA CINGULATA (STON.) SPAULD. & SCHRENK

Geographic distribution, relative prevalence, and losses

The bitter rot disease was reported almost entirely from the central eastern and Atlantic coast states. In New York, Guba reports, "Severe infection on Delicious (home orchard) in Chenango County. This is a new locality for apple bitter rot. Disease present in this orchard for some years." Anderson and Tehon note that its appearance in Pike and Adams Counties, Illinois marks an unusual advance northward. Two states, Maryland and Virginia, report an increased amount of bitter rot over 1923. In Maryland the disease is said to occur mostly in the eastern two-thirds of the state. Three states, Maryland, Delaware, and Illinois, report more than average amounts. Ohio, Indiana, Illinois, Kentucky, West Virginia, Delaware, South Carolina, Tennessee,

Apple - Bitter rot

Arkansas, Virginia, and Alabama all report less than last year and all but three report less than an average year.

Table 7. Estimated losses from bitter rot as reported by collaborators, 1924.

Percentage: States reporting loss :	:	Percentage: States reporting loss :	:
5 : North Carolina	::	1 : Virginia, Delaware,	:
4 : Georgia	::	: Alabama, South	:
2.5 : South Carolina	::	: Dakota, Ohio	:
2 : Mississippi	::	.5 : Illinois	:
1.5 : Maryland	::	:	:
:	::	:	:

Dates and counties of earliest reported appearance, 1924

June 24	Virginia	Frederick	July 19	Delaware	Sussex
June 28	North Carolina	Mecklenburg	July 23	South Carolina	Oconee
July 1	Indiana	Knox	July	Tennessee	Maury
July 3	Illinois	Adams	August 1	Pennsylvania	Dauphin
July 5	Mississippi	Pearl River	August 22	New Jersey	Monmouth
July 15	Arkansas	Howard	Sept. 2	Wisconsin	Walworth

Weather relations

It is evident that conditions did not favor the development of bitter rot during 1924. Fromme reports that in Virginia infection started early and plentifully but that midsummer weather was not favorable to excessive spread. McClintock in Tennessee says, "Dry weather and more thorough spraying served to hold the fungus in check, even on late varieties." Gardner (Indiana) reports, "Scattering infection appeared on Grimes in Knox County in July but never developed into an epiphytotic because of cool weather." Anderson states, "In southern Illinois there were heavy rains from July 12 to 22 and conditions seemed ideal for an outbreak of bitter rot. Fortunately, although the disease appeared in many orchards during this time, the dry weather during the latter part of July and throughout August served to hold this disease in check."

Table 8. Varieties of apple susceptible to bitter rot as reported in 1924.

State and Authority :	Variety	::	State and Authority :	Variety
Pennsylvania	York Stripe	::	Illinois	Transparent
Orton	:	::	Anderson	:
:	:	::	:	:
Tennessee	Roxbury Russet	::	Missouri	Willow Twig
Hesler	Liveland Raspberry	::	Maneval	Ben Davis
:	King David	::	:	Grimes Golden
McClintock	Grimes Golden	::	:	:
:	:	::	:	:

Apple - Bitter rot; Blackrot

Control

Adams from Delaware reports on control data: "Bordeaux applied June 5, 19, August 7, gave practically complete control on King David. Copper dust June 12, July 14, and 29 gave within 2% control. Later applications of dust would have been better. Bordeaux gave 60% defoliation. Copper dust no defoliation and less russetting of fruit."

Hurt (Virginia)(1) reports reduction of bitter rot infections by removing mummies.

Literature cited

1. Hurt, R. H. The importance of removal of mummies and affected fruit in apple bitter rot control. (Abstract) Phytopath. 15: 56. Jan. 1925.

BLACKROT OF APPLE CAUSED BY *PHYSALOSPORA CYDONIAE* ARN.Geographic distribution and relative prevalence

In general this disease was reported about the same as in 1923 and approximately the same as an average year. New Jersey, Indiana, Illinois, Arkansas, and Alabama reported the disease as more prevalent than 1923 and more prevalent than an average year. Mississippi was the only state reporting less than usual.

Zeller (2) has published a brief history of the disease as it occurs in Oregon. He reports both the canker and leafspot as endemic but states that its economic importance is limited because of the dry summer climate. Cuba reports, "Blackrot frog-eye leafspot is quite common in New York." Jehle says, "It is present in practically all Maryland orchards." Sherwood (West Virginia) reports, "Unusually heavy infection on foliage." Gardner says, "Equals scab in importance in Indiana." H. C. Young (Ohio) - "Of considerable importance." and Anderson (Illinois) - "Important as a fruitrot."

Types of injury

In some previous annual summaries there have been efforts to divide the injury according to whether foliage, fruit, or wood was affected. There is undoubtedly a very great amount of confusion concerning injury caused by the so-called blackrot fungus. Even the leafspot can hardly be stated with any degree of accuracy to be due to *Physalospora cydoniae*. There are certainly several types of these leafspots. Just what the primary and, in some cases, secondary factors may be which produce them is a question which is far from being settled. There is a great mass of circumstantial evidence of the strongest kind indicating that a high percentage of leafspot is due to a fungus which overwinters in dead twigs, or bacterial blight cankers. It would undoubtedly be of great value to the Plant Disease Survey if collaborators would send in specimens of the various types of leafspot injury which they find and include a note as to the relative prevalence of each type.

New York, New Jersey, West Virginia, and Maryland report serious foliage injury. In Minnesota, Illinois, and West Virginia twig infection occurred

Apple - Blackrot

following fireblight, and New Jersey also reports twig injury. In New York the disease was important only as cankers. Illinois reports it as injurious on fruit. In Indiana blackrot was noted following rust infection on Rome Beauty fruit. This type of injury has been very common in West Virginia, and was reported also from Arkansas.

Losses and importance

Martin reports that in New Jersey, "Some orchards were defoliated 50% by June 24." Guba reporting on July 1 says, "In some orchards in Rockland County, New York, blackrot leafspot is serious, causing defoliation in some instances." Sherwood (West Virginia) reports, "Leafspot is severe on old trees carrying cankered twigs in spite of spraying. On younger trees which have been kept well pruned the leafspot infection was less." Fromme - "Not as serious in Virginia as anticipated from earlier reports and most commercial orchards not seriously injured."

Table 9. Estimated losses from blackrot as reported by collaborators, 1924.

Percentage: States reporting loss :	:	Percentage: States reporting loss :	:
5 :	Maryland	1 :	Vermont, Connecticut,
4 :	Ohio, Indiana,	:	New York,
:	Arkansas, Georgia	:	New Jersey, Virginia,
3 :	North Carolina, Iowa	:	South Carolina,
2 :	West Virginia, Penn-	:	Mississippi,
:	sylvania (leafspot)	:	Illinois, Michigan
1.5 :	Delaware	.5 :	Alabama
:	:	:	:

Weather relations

In view of the different types of injury it is rather difficult to get evidence concerning the relations of the weather to the disease in all of its aspects. The early part of the season was particularly wet in the eastern states but the temperature was very low. Later in the season when the fruit-rot was likely to develop there was generally too little moisture. Gardner reported that in Indiana high rainfall late in the season was very favorable.

Dates and counties of earliest reported appearance, 1924

April	West Virginia	Pendleton	June 10	New Hampshire	Rockingham
May 6	New Jersey	Cumberland	June 14	Minnesota	Mower
May 12	Pennsylvania	Adams(leafspot)	June 15	Arkansas	Washington
May 12	Virginia	Frederick	July 2	Iowa	Linn
May 14	Delaware	Sussex	July 9	Indiana	Lawrence
June 3	Connecticut	New Haven	July 21	New York	Dutchess
June 4	Illinois	Montgomery	July 25	Pennsylvania	Adams(blackrot)
			Sept. 1	Michigan	Livingston

Apple - Blackrot

Varietal susceptibility

Table 10. Susceptibility of apple varieties to blackrot as reported in 1924.

State and authority	Varieties
<u>Fruit severely affected</u>	
Pennsylvania - Orton	: York
Arkansas - Dept. Pl. Path.	: Crabapples
Indiana - Gardner	: Calyx-end rot of Transparent, Delicious.
	: Arkansas, Gideon

<u>Fruit affected</u>	
Delaware - Adams	: Calyx-end rot of Rome Beauty, Ben Davis; rot of
	: Crimson Beauty, Transparent, Liveland
	: Raspberry
Indiana - Gardner	: Calyx-end rot of Wealthy, Jonathan, Rambo,
	: numerous others; rot following rust infec-
	: tion on Rome Beauty
Minnesota - Sect. Pl. Path.	: Greening

<u>Leaf infection</u>	
New Jersey - Martin	: Starr, Hagloe, Baldwin, Ben Davis, Red Astra-
	: chan, Rome Beauty, Winter Banana, Twenty
	: Quince, Smith Cider, Stayman Winesap
Delaware - Adams	: Stayman, Stark, Williams, Winesap, Transparent
Tennessee - Hesler	: Kinard
Minnesota - Sect. Pl. Path.	: Greening

Control

In general there seems to have been little difficulty with control measures.

Pennsylvania: Was held in check satisfactorily by lime-sulfur scab schedule with prepink. (Orton & Walton)

Maryland: The disease was checked by a thorough application of concentrated lime-sulfur solution 1-40 during the pink bud stage. In an orchard in Worcester County, one in Caroline County, and one in Charles County, a portion of the orchard was not sprayed during the pink bud stage. In all of the unsprayed trees in these orchards there was a severe infestation of leafspot which will

Apple - Blackrot; Rust

result in a loss of from 20 to 50% of the leaves. In the same orchards where the pink-bud spray was applied there was very little leafspot and there will be little or no defoliation. (Jehle)

Tennessee: Held in check to some extent by sprays used for blotch. (McClintock)

Indiana: The disease not controlled by scab sprays. (Gardner)

Literature cited

1. Shear, C. L., N. E. Stevens, and M. S. Wilcox. Botryosphaeria and Physalospora on currant and apple. Jour. Agr. Res. 28: 589-598. May 1924.

2. Zeller, S. M. Sphaeropsis malorum and Myxosporium corticola on apple and pear in Oregon. Phytopath. 14: 329-333. July 1924.

RUST CAUSED BY GYMNOSPORANGIUM JUNIPERI-VIRGINIANAE SCHW.

Geographic distribution and relative prevalence

Rust was reported through the same general territory as usual but was more destructive in several sections. Pennsylvania, New Jersey, Maryland, West Virginia, Virginia, Kentucky, Indiana, Illinois, Tennessee, Arkansas, and Missouri report more rust than in 1923. All of the states except Pennsylvania, West Virginia, Virginia, and Arkansas report more than for an average year. Vermont, New York, Wisconsin, Minnesota, Iowa, and Georgia report less rust than in 1923.

Maryland, West Virginia, and Arkansas all report rust infection as the most severe for many years. In the former state, according to Temple (July 15), "There will be more premature defoliation due to rust than at any other time during the past ten years." Giddings reports in West Virginia, "Very uniform and heavy infection but it occurred late and is just beginning to show up (June 23). Rust is more prevalent than it has been for several years. Young rust galls which will mature in 1925 were found June 25." Indiana, Illinois, Missouri, Arkansas, Tennessee, and Kentucky, comprising a block of adjacent states, report severe injury from the disease this year. Weber reports rust found on trees at Gainesville, Florida.

Losses and importance

During the past season there was an unusual amount of fruit injury reported from a number of states, including Virginia, West Virginia, Tennessee, Arkansas, Indiana, and Kansas.

Maine: One to five percent infection in Yellow Transparent fruits from one locality. (Folsom)

West Virginia: A large amount of fruit infection and frequent cases where it is difficult to identify from external symptoms. (Giddings)

Apple - Rust

Indiana: In many cases, particularly Gideon, the fruit lesions showed no waxy, yellow color nor fruit bodies, and often appeared as a puckering and internal browning of the tissues about the calyx-end. Sections showed the rust mycelium, however.

On Rome fruit very destructive effects were produced by the rust. The fruits were often greatly deformed and stunted, particularly by pedicel and stem-end lesions and there was much cracking of the tissues in the rust lesions. Many fruits were blighted when very small by pedicel infection. Abundant petiole and stem infection was also found on Rome.

Delicious fruit was seriously deformed by calyx-end rust lesions. Since this is a high priced variety, real losses were caused. (Gardner)

Table 11. Estimated losses from rust as reported by collaborators, 1924.

Percentage: loss	States reporting	Percentage: loss	States reporting
8	: Virginia	1	: Delaware, Maryland,
5	: West Virginia		: South Carolina,
2.5	: Nebraska		: Illinois, Iowa, South
2	: North Carolina		: Dakota
1.5	: Arkansas	.5	: Connecticut, Pennsyl-
			: vania, Georgia, Ohio,
			: Kansas.

Dates and county of earliest reported appearance, 1924

May	Connecticut	New Haven	June 15	Indiana	Orange
May 9	Virginia	Montgomery	June 24	New Jersey	Burlington
May 10	South Carolina	Edgefield	June 28	North Carolina	Mocklenburg
May 16	Delaware	Sussex	June 30	Iowa	Monroe
May 18	Illinois	Johnson	July 4	North Dakota	Richland
June 2	Pennsylvania	Adams	July 24	Mississippi	Lee
June 6	New York	Ulster	Sept. 5	New York	Essex
June 12	Minnesota	Houston			

Weather relations

The extremely wet spring was very favorable to rust infection, but the low temperature which prevailed throughout most of the eastern states certainly was a factor in preventing even far more serious losses than were reported. The development of rust galls, as well as of apple foliage, was held back by the cold weather so that the amount of infection was considerable.

Vaughan of Wisconsin reports, "It seemed to be too cold at the time of spore discharge in June, and the amount of infection was slight for this state."

Varietal susceptibility

New York: Dutchess County - Rome Beauty and Wealthy affected. Ulster County - Varieties most susceptible in order named are: Winter

Apple - Rust

Banana, Wealthy, Jonathan, Rome Beauty, York Imperial, Hubbardston, Winesap, Newton Pippin. (Guba)

New Jersey: Found on Rome, Wealthy, Winter Banana, Smokehouse. (Martin)

Pennsylvania: York, Winter Banana very susceptible. Fruit of Winter Banana very susceptible. Rambo and Smokehouse much more resistant. Red Astrachan shows trace of infection. (Orton)

Delaware: Rust on fruit of York, Early Ripe, Liveland Raspberry. (Adams)

Maryland: Leaves and fruit of Winter Banana variety very susceptible; also York. (Jehle & Temple)

Kentucky: Stark Golden Delicious as susceptible as Wealthy and Rome Beauty. (Magill)

Tennessee: Kinnards show numerous infections on leaves, but lesions very small. (Hesler)

Arkansas: Much defoliation on susceptible varieties among which Ben Davis, Jonathan, and Bell Flower were noted. Fruit on Ben Davis affected 10%. (Dept. Pl. Path.)

Indiana: Calyx-end infection of rust was very serious in the varieties Dutchess, Delicious, Wealthy, Rome Beauty, Jonathan, Gideon, Red June; and was observed on the varieties Winesap, Stayman, Grimes Golden, Stark, Transparent, Esopus, Rambo, Arkansas, Ben Davis, Salome, Springdale, Florence crab, Wagener, Sweet June, Rhode Island Greening, Dr. Matthews, Excelsior, White Pippin, Indian, Peter, Domino, Winter Banana, Iowa Blush. In addition, leaf infection was noted on Missouri Pippin, Yellow Bellflower, Ronk, Fanny. (Gardner)

Kansas: Noted on Jonathans and Wealthy. Some fruit injury on Jonathans in commercial sections. (Stokdyk)

Wealthy was reported also from Massachusetts, Minnesota, and Iowa, and crabapples from Minnesota and North Dakota, as very susceptible; while Greenings were said to be resistant in Minnesota.

Control

New York, West Virginia, Virginia, and Arkansas report evidence of benefits from red cedar eradication.

Virginia: Marked contrast is seen between localities where red cedars have been removed and those in which there has been no concerted eradication. In the former localities the losses will be of slight importance. (Fromme)

Apple - Blister Canker

Indiana: Scab sprays did not prevent rust. The Bordeaux blotch spray seemed to be more effective but none gave good control of calyx- and fruit infection. (Gardner)

BLISTER CANKER CAUSED BY *NUTRULARIA DISCRETA* (SCHW.) TUL.

Blister canker is a type of disease not likely to cause sudden losses nor to change suddenly in the amount of injury it produces. In 1924 Illinois reports more injury than usual and Ohio and Pennsylvania less. Delaware, Virginia, West Virginia, Tennessee, Michigan, Arkansas, Iowa, Missouri, and Kansas report approximately an average amount of injury.

Collaborators in a number of states including New York, Delaware, West Virginia, and Indiana note that it is particularly injurious only in old or seriously neglected orchards.

Virginia: Most important canker. (Fromme)

Arkansas: Appears to be becoming less prevalent, possibly due to better pruning and care and few plantings of Ben Davis. (Dept. Pl. Path.)

Illinois: The pest of Ben Davis, which is practically the only variety which suffers severely. (Anderson & Tehon)

Missouri: Twenty acres of a sixty acre orchard killed. (Maneval)

South Dakota: Causing much loss in eastern section of the state. (Petry)

Kansas: Blister canker can be found in any part of the state, ultimately directly or indirectly is the cause of the death of most of the trees. (Stokdyk)

Susceptible varieties

Table 12. Apple varieties affected by *Nutrularia discreta* as reported, 1924

State and authority	Varieties affected
West Virginia - Giddings	: Ben Davis
Ohio - H. C. Young	: Yellow Transparent, Jonathan, Baldwin
Arkansas - Dept. Pl. Path.	: Ben Davis
Indiana - Gardner	: Ben Davis, Yellow Transparent, Twenty Ounce, Grimes
Illinois - Anderson & Tehon	: Ben Davis
Iowa - Porter	: Northwestern Greening, Ben Davis
Missouri - Maneval	: Rome, Ben Davis, Jonathan, Missouri Pippin

Apple - Fireblight

Literature

1. Anon. Illinois blister canker. Iowa Agr. Exp. Sta. Rept. 1923: 47. 1923.
2. Swartwout, H. G. Treatment of apple canker disease. Mo. Agr. Exp. Sta. Bul. 210: 57. 1924.

FIREDLIGHT CAUSED BY *BACILLUS AMYLOVORUS* (DURR.) TREV.Geographical distribution

Apple fireblight seems to have been more prevalent than usual in central United States including Indiana, Illinois, Kentucky, Michigan, Wisconsin, Minnesota, Iowa, Missouri, Arkansas, North Dakota, South Dakota, Kansas, and Colorado, and also in Georgia and Alabama; and Delaware and Maryland. It was about the same or less than usual in the other eastern states and below average in the far western states. More blight than in 1923 was reported from Illinois, Minnesota, South Dakota, Iowa, Missouri, Kansas, Colorado, Texas, Arkansas, Delaware, Alabama, and Georgia. The states of Wisconsin, Indiana, Ohio, Virginia, West Virginia, Pennsylvania, New York, and Massachusetts report loss injury.

Economic importance and losses

Table 13. Estimated losses from fireblight as reported by collaborators, 1924.

Percentage: States reporting		Percentage: States reporting	
loss	:	loss	:
7	:	1.5	:
6	:	1	:
5	:	.5	:
4	:	Trace	:
3	:		:
2.5	:		:
2	:		:
	:		:
	:		:
	:		:

In Minnesota, according to the Section of Plant Pathology, fireblight was the most serious disease of apple. Illinois, Kansas, and Missouri report it as more severe than for many years. In Kansas blossom blight was serious in commercial apple sections on Jonathan. In some sections of Colorado and in Arkansas both blossom and twigblight were very important, and blossom blight was common on resistant varieties in the latter state. Petry reported that some orchards in the western part of South Dakota were destroyed by fireblight. In New York young orchards suffered greatest damage from the disease.

Apple - Fireblight

The following report by Gardner of Indiana regarding the relation to blight in pear is interesting:

"In a planting of young Dutchess, Knox County, fireblight was serious in 1922 and 1924 while in 1923 when there was such a bad epiphytotic it was not serious in this block. There is a large pear orchard one-half mile distant which blossomed in 1922 and 1924 but not in 1923. There is a large apiary between. Blight in the Dutchess seems to be correlated with the seasons when this pear orchard blossoms."

V. H. Young in Arkansas and Learn in Colorado also noted that blight was especially severe near pear trees.

Blossom and twigblight were both reported from practically every state reporting the disease. Both were important in Tennessee, Minnesota, South Dakota, Colorado, and Arkansas, while blossom blight was more serious in Missouri, Kansas, and Kentucky, and twigblight in Delaware, New York, West Virginia, and followed by canker in Pennsylvania. Spurblight when the apples were about the size of cherries caused considerable loss locally in Tennessee. Infection of the fruit was important in Illinois and was reported also from Georgia and Colorado. A significant report concerning the collar blight phase of the disease in Pennsylvania is quoted below.

Pennsylvania: Little blossom blight, some twigblight which was generally followed by canker development. Most important phase is the root or collar blight which appears to be on the increase. We believe that collar blight is again returning to its upward swing. Apparently this phase of fireblight lies a year or two behind the epiphytotics of twigblight. (Orton)

Indiana: Serious locally as twigblight of Jonathan: blossom blight of Grimes. Limiting factor with Jonathan variety in Indiana. Frequently destroys Grimes bloom but does not kill the wood. Jackson noted numerous cankers on apple limbs in Posey and Vanderburg Counties (Gardner)

Colorado: Twigblight more common to young Jonathan and blossom blight to older Jonathan. One orchard 25% loss of fruit was estimated. (Learn)

Dates and counties of earliest reported appearance, 1924

April	Arkansas	Washington	June 19	Montana	Flathead
April 25	Illinois	Johnson	June 19	Minnesota	Washington
May 6	Mississippi	Lee	June 24	Wisconsin	
May 12	Virginia	Nottoway	June 24	Connecticut	New Haven
May 16	South Carolina	Spartanburg	June 25	Iowa	Lee
May 17	Indiana	Gibson	June 30	North Dakota	Cass
May 18	Virginia	Montgomery	June 30	Pennsylvania	Center
May 20	Ohio	Lorain	July	South Dakota	Brookings
June 13	Colorado	Delta	July 1	New York	Wayne
June 17	New Jersey	Middlesex			

Apple - Fireblight

Weather relations

It would appear that the temperature relations were quite unfavorable in the eastern United States. Moisture conditions were generally favorable but in most sections the temperature was very low. This may have been of primary importance as a factor which prevented the activity of insects and the carrying of inoculum.

Delaware: Cool and wet weather very favorable. Driving rains and wind were factors in spreading infection. (Adams)

Virginia: At Crozet it was almost non-existent during the wet season of 1924 and very prevalent in the dry season (spring) of 1923. (Fromme)

Wisconsin: Much less than usual. Is this lack of blight to be correlated with the cool season? (Vaughan)

Michigan: Practically no blossom blight. First seen July 15; season exceptionally cool and rainy. (Coons)

Collaborators in Arkansas, Michigan, and Illinois comment upon the very late development of the disease during the 1924 season. This was evidently due to the late active growth of apple trees, since they were held back early in the season by the cold weather. Learn reported that moisture in Colorado was below normal but that, "Previous to the period of blight infection there was quite a little rain for a week followed by a hot humid condition." Cozing of fireblight canker was reported by Guba, May 14 in Ulster County, New York and by Vaughan in Wisconsin on May 10. The unusually dry weather of the Pacific slope doubtless accounts for the small amount of injury occurring there.

Varietal susceptibility

Table 14. Susceptibility of apple varieties to fireblight as reported in 1924.

State	: Varieties affected	:: State	: Varieties affected
<u>Most susceptible varieties</u>			
New York	: Gravenstein, Rhode Island	:: Ohio	: Wagener, Rhode Island
	: Greening	::	: Greening, Rome Beauty,
Delaware	: Winesap, Cole, Jonathan,	::	: Jonathan, Baldwin
	: Transparent, Stayman	:: Indiana	: Jonathan, Grimes
Tennessee	: Yellow Transparent, Early	:: Illinois	: Jonathan, Transparent
	: Williams	:: Minnesota	: Greening, Transcendent crab
Arkansas	: Jonathan, Maiden Blush,	:: Iowa	: Yellow Transparent
	: Grimes	:: Kansas	: Jonathan
-----	: -----	:: Colorado	: Jonathan, Gano, Ben Davis

Noted on

New York : Alexander, Twenty Ounce, :: Indiana : Duchess
 ----- : Rhode Island Greening ----- :: Colorado : Winesap

Apple - Fireblight; Fruitspot

State	Varieties affected	State	Varieties affected
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Resistant

Delaware	: Liveland Raspberry	:: Minnesota	: Wealthy (blossom),
Tennessee	: Early Harvest, Early Ripe	::	: Greening (twig)

Blossom blight on

New York	: Fall Pippin	:: Minnesota	: Greening, Whitney
Tennessee	: Yellow Transparent, Early	:: Kansas	: Jonathan
	: Williams	:: Colorado	: Jonathan
Indiana	: Grimes	::	:
	:	::	:

Twilight was observed on Jonathan in Colorado, Indiana, Tennessee, and Iowa, and on Wealthy in Iowa. Body blight on Willow Twig was reported from Illinois.

FRUITSPOT CAUSED BY PHOMA POMI PASS.

Fruitspot was reported as severe in some orchards in New Jersey, especially in Burlington County. In one orchard of Wealthy in this county it was severe although the trees had received regular spray applications. In Pennsylvania it was generally distributed but was not important except on susceptible varieties, and was not troublesome at all in sprayed orchards. Apparently dry weather held it in check. In Delaware it was said to be very severe on late apples, with heaviest infection appearing where no August spray was applied. West Virginia reported it as rather unimportant but apparently increasing generally in amount. In Kentucky it was important on King David, which was the only variety on which it was observed in commercial orchards. It was less prevalent than usual in Ohio. In other states reporting it Massachusetts, New York, Arkansas, Illinois, Michigan, and Missouri - It was not important. Dates of first appearance noted are, August 15 in Burlington County, New Jersey, and August 21 in Sussex County, Delaware. The greatest amount of loss reported is one-half percent from New Jersey, Delaware, Pennsylvania, and Maryland.

Table 15. Apple varieties susceptible to fruitspot as reported in 1924.

State and authority	Varieties
Pennsylvania - Orton	: Grimes Golden
New Jersey - Martin	: Wealthy, Delicious, Paragon, Smith Cider, : Cooper Market, Stayman, Penrock, New, Bellflower
Delaware - Adams	: Grimes Golden, Jonathan
Kentucky - Magill	: King David
Ohio - H. C. Young	: Rome Beauty

Apple - Fruitspot; Bitter pit

Recent literature

Brooks, Charles. Phoma fruitspot of apples. Amer. Fruit Grow. Mag. 44(2): 14, 28, 53. Feb. 1924.

Thomas, R. C. A new fruit spot of the apple - the Brooks' spot. Proc. Ohio State Hort. Soc. 56: 92-96. 1923.

BITTER PIT, NON-PARASITIC

Bitter pit is undoubtedly general throughout the apple growing section of the United States but there is a serious question as to whether most pathologists distinguish between it and fruitspot. Some collaborators reported it as, "Not recognized." It was said to be more injurious than last season in Delaware, Maryland, Kentucky, Arkansas, and Oregon, and less prevalent in New Hampshire, Massachusetts, New York, Pennsylvania, Virginia, West Virginia, and Indiana.

Estimated losses reported by collaborators were Virginia 3%, West Virginia 1%, Maryland and New Jersey 0.5%.

New York: Important locally and only on certain varieties, especially on trees not bearing a full crop. (Guba)

Pennsylvania: Nearly always of importance on Baldwin. (Orton)

Delaware: Very severe on late harvested Grimes. (Adams)

West Virginia: Noted on York Imperial particularly, appearing much later in the season than usual. (Sherwood)

Kentucky: In commercial plantings only found on Grimes where it caused considerable injury. (Magill)

Arkansas: Important on Grimes. Noted also to some extent on other varieties in spite of greater rainfall than usual. (Dept. Pl. Path.)

Oregon: Bitter pit is very prevalent in the apples in western Oregon this year. The season has been dry, and I presume the blemish will show up wherever the crop was dependent upon rainfall or where the irrigation water was deficient. Two cars of Willamette Valley apples the other day ran about 20% blemished by bitter pit. (R. L. Ringer, Sept. 15, in U. S. Dept. Agr. Bur. Econ. Fruit & Veg. Div. Letter, Sept. 26.)

Table 16. Varieties susceptible to bitter pit as reported in 1924.

Variety	: States reporting
Grimes Golden	: Delaware, Kentucky, Arkansas, Ohio, Indiana
Baldwin	: New Hampshire, Ohio, Pennsylvania
Stark	: Ohio, Indiana
Jonathan	: Ohio
York Imperial	: West Virginia
Windsor Chief	: Wisconsin

Apple - Jonathan spot; Crowngall

JONATHAN SPOT, UNDETERMINED

Jonathan spot was reported as less severe in Indiana, more severe in Minnesota, and about as usual in North Dakota. It was said to be injurious to stored fruit in Idaho, Iowa, Pennsylvania, and Connecticut.

Arkansas: Apples obtained from several places showed symptoms of Jonathan spot superficially but unlike it showed discoloration of the fibro-vascular bundles. (Dept. Pl. Path.)

Pennsylvania: Methods of handling fruit appear important in producing or preventing this trouble. (Orton)

Varieties reported susceptible were Jonathan from Pennsylvania, Iowa, Arkansas, Indiana, and Kansas; and Wealthy from Minnesota and North Dakota.

CROWNGALL CAUSED BY BACTERIUM TUMEFACIENS EFS. & TOWN.

The symposium on crowngall at the Cincinnati Meeting aroused much interest in this disease. The statements of several collaborators are given below:

Connecticut: Dug up one of the trees in the crowngall experimental orchard and found very little gall showing; it has spread little or none during the 6 to 8 years the trees have been set out. (Clinton)

New York: Apple stem tumor was noted on young (7 year old) apple trees of Tioga variety in Wayne County. Disease is exactly similar to the one described and illustrated by Nellie A. Brown in Journal of Agricultural Research, 27: 695-698, but its presence cannot be ascribed to the causes given. Disease is very serious on tree, producing large wart like growths. (Guba)

Delaware: Rootrot follows soft galls causing injury in Sussex County. (Adams)

Tennessee: Early Harvest, Wealthy, Horse, and Rome Beauty are susceptible varieties. Serious in nurseries, 50% maximum. (McClintock)

Michigan: One nursery reports loss of 25% of this year's trees. (Bennett)

Iowa: Local in nurseries, 25%. (Porter)

South Dakota: Susceptible wild varieties not affected, indicating that the causal organism is not normally present in large areas. (Petty)

Arkansas: Nurseries complain of large losses, many growers complain that trees affected with it are shy bearers. (Dept. Pl. Path.)

Apple - Crowngall; Sooty blotch and Flyspeck

Mississippi: Abundance of nursery stock infected; 90% maximum. (Neal)

New Mexico: Fifty percent. (Crawford)

Arizona: General, 6% reduction in yield. (R. B. Streets)

Recent literature

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Stewart, F. C. Recommendations for the improvement of official inspection for crown gall. Phytopath. 14: 172-173. 1924.

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SOOTY BLOTCH AND FLYSPECK CAUSED BY *PHYLLACHORA POMIGENA* (SCHW.) SACC.
AND *LEPTOTHYRIUM POMI* (MONT. & FR.) SACC.

This was not particularly prevalent or injurious in any large areas. The report from Illinois indicates that it was much more prevalent than in 1923. Pennsylvania, West Virginia, and Missouri mention it as less common. It would seem likely that the midsummer dry weather which prevailed in much of the eastern apple growing areas was an important factor preventing development of sooty blotch.

The disease is reported as injurious in neglected and unsprayed orchards in Arkansas and Delaware.

Pennsylvania: Sooty blotch occurred on Russet and Greening. (Orton)

Indiana: Sooty blotch is serious on Winesap, Stayman, Black Twig, and Stark in Orange County. (Gardner)

Illinois: This is the most general attack of sooty blotch ever recorded in this state. A comparison of sooty blotch and flyspeck indicates a striking difference in occurrence. (Anderson & Tehon)

POWDERY MILDEW CAUSED BY *PODOSPHAERA LEUCOTRICHIA* (ELL. & EV.) SAIM.

Geographic distribution

As usual, although reported from a number of states scattered throughout

the country, powdery mildew was of little or no importance in all except four, all in the West - Colorado, New Mexico, Arizona, and Idaho.

Connecticut: Apparently not uncommon in early summer on twigs but no serious injury. (Clinton)

Pennsylvania: Chiefly in nursery stock. Dry weather probably checked it. Jonathan especially susceptible. (Orten)

West Virginia: More on Gano, Jonathan, Rome Beauty, and Den Davis than other varieties, but infection generally not severe. (Sherwood & Giddings)

Colorado: Very general in Mesa County about Grand Junction and in several orchards. Fifty to seventy-five percent of the leaves infected. Severe enough on some trees to cause young shoots to die. Many orchards show the leaves to be curled up and fungus growth beneath gives a white appearance. Some growers attempt to control it by spraying. No varietal susceptibility noticed. (Learn)

New Mexico: Of considerable importance locally. Blossoms, leaves and terminals killed. Three percent loss reported. (Jonathan and Den Davis susceptible, Winesap somewhat resistant. (Crawford)

Idaho: Quite common in unsprayed orchards. (Hungerford)

Dates and counties of earliest reported appearance, 1924

April 24	West Virginia	Berkelcy	June 6	Illinois	Jersey
May 1	Virginia	Albemarle	June 9	Colorado	Mesa
May 6	New Mexico	Chaves	July 10	Wisconsin	Rock
May 31	Delaware	New Castle	Aug. 5	Pennsylvania	Lawrence
June 4	Connecticut	New Haven			

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Congrès Path. Vég. Strasbourg. 1923: 37-41. 1923.
...(Apple powdery mildew)

BROWNROT CAUSED BY SCLEROTINIA CINEREA (DON.) SCHROET.

Brownrot was reported as unimportant from a number of states east of the Mississippi from Massachusetts to Wisconsin and Alabama, and from Arkansas and Iowa. It follows insect or fungus injury in New York, and is associated with codling moth injury in Illinois, according to collaborators. Gardner stated

Apple - Brownrot; Rootrots

that in Indiana the disease was noted only on Esopus as a storage rot. In Massachusetts, Delaware, and Arkansas it was reported as occurring mostly on early varieties. The variety Red Astrachan was mentioned as especially susceptible in New York and Delaware, Yellow Transparent in Arkansas, and Greenings and Russet in Pennsylvania.

ROOTROTS

Black rootrot caused by Nectria spp.

Black rootrot was reported from Massachusetts, New York, Pennsylvania, Virginia, West Virginia, Kentucky, Tennessee, Georgia, Ohio, Alabama, and Michigan.

New York: Important everywhere, especially serious on King and causing 1% loss. The rot is secondary; the primary cause is usually winter injury. (Guba)

Virginia: Same as usual, 1%. (Fromme)

Kentucky: About 2% of the trees per year die in most orchards, presumably due to this disease. The following varieties have been found dying; Winesap, Stayman, King David, Ben Davis, and Rome. No reports of Delicious dying so far. (Magill)

West Virginia: Is seen only in eastern section, mostly on Ben Davis. Appears to be closely connected with injuries such as those due to mice. (Sherwood)

Tennessee: Continues to kill trees here and there in many orchards. (McGlintock)

Illinois: Somewhat more prevalent than usual causing greater injury to young orchards in Johnson County. (Anderson & Tehon)

Mushroom rootrot caused by Armillaria mellea (Vahl) Quel.

Mushroom rootrot was very common on neglected trees in home orchards in Delaware. In Pennsylvania it is usually found following collar blight on the roots. It was said to be important on recently cleared land in West Virginia and Arkansas, and was reported also from Georgia, Michigan, and Minnesota (sporophores found on bark at base line).

Other rootrots

"In Kentucky a rootrot due to *Sclerotium rolfsii* Sacc. occurred in grafts which were set in a bed and manured heavily with manure containing chips." (Valleau)

"*Ozoneium omnicorum* Shear was very important in the black lands of Texas, where apples cannot be grown on account of this disease. Four percent loss." (Taubenhaus)

Apple - Frost injury

FROST INJURY

Frost injury was reported as important from Washington, Idaho, South Dakota, Minnesota, Illinois, Indiana, Ohio, West Virginia, Pennsylvania, Massachusetts, and Mississippi.

Blossom injury

Blossom injury was reported from Massachusetts and Connecticut as slight. Clinton says that wet cool weather at blossoming time is a more important factor than frost in reducing the set in Connecticut. Crawford of New Mexico reports it as very important, causing 20% reduction. Hungerford of Idaho reports heavy losses to early blossoming varieties, but later blossoming varieties produced an average crop. Dana of Washington says, "Late spring frosts have been very general over eastern and central Washington apple districts. The injury was so serious as to influence many growers to stop spraying." West Virginia and Pennsylvania report considerable blossom injury.

Leaf injury

Leaf injury is specifically reported from Massachusetts, Delaware, and West Virginia:

Massachusetts: In many instances killing or seriously injuring; the first leaves. (Osmun)

Delaware: Common on first leaves in blossom clusters of early opening varieties such as Early Ripe. (Adams)

Other types of frost and winter injury

Alabama: Severe winter injury following general freeze. Many young trees killed. (Miles)

West Virginia: Grimes Golden, Winesap, and Ben Davis particularly affected. Some russett on fruit. (Sherwood)

Ohio: Noted freezing of 8 to 12 year old Grimes, Baldwin, Stayman; general. (H. C. Young)

Indiana: Frost bands and russett in southern Indiana. Much confused with Bordeaux injury but occurred on unsprayed trees of Ben Davis, Grimes Golden, Winesap, Arkansas, and Rome Beauty. Chenango banded in Miami County. (Gardner)

Wisconsin: Low temperature in December killed buds in northern section. (Vaughan)

Minnesota: Serious bud, twig, and root injury in apple section; 5% loss estimated. (Dept. Pl. Path.)

South Dakota: Winter frost has killed some trees. Early frost combined with rainy weather reduced stand of fruit. (Petty)

Apple - Frost injury; Other diseases

Illinois: About December 20, 1924 the central and western portion of this state was visited by an "ice storm" rain freezing on the branches followed by a heavy wind. It was the worst ever experienced in this section of the country. ** It caused great injury to fruit trees. I would estimate the damage to fruit trees at \$75,000 to \$100,000. (Anderson)

Injury to trees themselves was also reported from Pennsylvania, Tennessee, Ohio, Michigan, and Washington.

Literature

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Morris, O. M. Winter injury of fruit trees. West. Fruit. 6(3): 1-4, 23. March 1924.

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OTHER DISEASES

Fruitrots. spots. etc. (References 3, 4, 22, 23, 24, 27, 32, 34)

Alternaria sp., rot - Washington; coremold - Indiana.

Cephalothecium roseum Cda., pinkrot - New York, Illinois.

Coniothyrium sp. (probably C. pirinum (Sacc.) Sheldon) fruiting on fruit-spot - Illinois.

Cork (nonpar.) - Washington

Droughtspot (crinkle; nonpar.) - Delaware, on Stayman, Stark, York, Ben Davis; Minnesota.

Fusarium sp., corerot - Indiana.

Penicillium sp., rot - Connecticut.

Phytophthora cactorum (Leb. & Cohn) Schroet. rot - Pennsylvania

Leaf diseases (30)

Cercospora mali Ell. & Ev. - Mississippi, Texas.

Coniothyrium sp. - Illinois.

Apple - Other diseases; Miscellaneous literature

Corticium stovensii (Noack) Durt, hypochnose - Alabama, Mississippi.
Septoria piricola Desm. - Illinois (abundant in one locality)

Bark and wood diseases (8, 11, 13, 21, 33, 37, 40)

Measles (undet.) - West Virginia, Maryland, Missouri, New Mexico, Arizona.
Myxosporium corticolum Edg. - Pennsylvania, South Dakota, Oregon.
Rosette (undet.) - Important in many sections of Idaho.
Schizophyllum commune Fr. - Minnesota, Washington.
Septobasidium pedicellatum (Schw.) Pat. - Mississippi
Septobasidium retiformis (Berk. & Curt.) Pat. - Texas.
Stereum purpureum Pers. - Washington.

Miscellaneous (25, 28, 35)

Chlorosis due to excess of lime - Texas.
Fertilizer injury from applications of sodium nitrate - South Carolina
Spray injury and dust injury due to copper sprays and dust - Ohio, Connecticut, Delaware, Indiana. More specific spray injury combined with scab injury may be found reported under that disease.

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Apple - Miscellaneous literature

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Pear - Blight

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PEARBLIGHT CAUSED BY *BACILLUS AMYLOVORUS* (BURR.) TREV.

Pear blight seems to have been unusually severe in some of the southern states including Florida, Georgia, Alabama, Arkansas, and Kansas; in two of the central states - Wisconsin and Illinois; and in three of the eastern states - Maryland, New Jersey, and Delaware. It is reported as less severe in New York, Connecticut, Ohio, Kentucky, New Mexico, and Idaho.

Gardner comments upon the fact that in Indiana pears are not a commercial crop, probably because of this disease. It might be noted further that in the commercial orchard sections of West Virginia, and presumably in other states, the growing of pears is discouraged because of its association with fireblight on apples. In West Virginia pears which were near commercial apple orchards have been watched closely for the past fifteen years and it has been found that wherever the pears were destroyed, the amount of injury from apple fireblight was reduced to a minimum. It is particularly easy to meet such a problem in sections where the commercial apple orchards are large, as the cooperation of a few growers can render extensive areas free from pears which might carry infection.

Table 17. Estimated losses from blight as reported by collaborators, 1924.

Percentage: States reporting loss :	Percentage: States reporting loss :
60 : Arkansas	5 : Arizona
50 : Georgia, South	4 : West Virginia, Texas
: Carolina	3 : Ohio
35 : Mississippi	2 : Michigan, Kansas
20 : Alabama, North	1.5 : Delaware
: Carolina	1 : New York, Vermont,
15 : Kentucky, Illinois	: Connecticut
8.5 : Maryland	:

Dates and counties of earliest reported appearance. 1924

April	Louisiana	East Baton Rouge	June 15	Colorado	Montrose
May 6	North Carolina	Lenoir	June 16	New Jersey	Middlesex
May 27	Arizona	Santa Cruz	June 17	Ohio	Scioto
May 28	South Carolina	Anderson	July 10	New York	Wayne
June 5	Illinois	Calhoun	July 29	Connecticut	New Haven
June 14	Wisconsin	Washington			

New York: General, but severe only locally and in young orchards.
(Cuba)

Delaware: Very severe on Kidffers. (Adams)

Tennessee: Very general this year over eastern Tennessee. (Hesler)
Chinese and Japanese varieties are resistant as are seedlings of these varieties. (McClintock)

North Carolina: Plantings left in sod are less affected. (Fant)

Georgia: General; most of the old orchards in south Georgia entirely killed long ago, others are lingering. (Boyd)

Florida: More plentiful during the past season than ever before. It was well distributed over the state. Certain varieties of Sand pears supposed to be resistant have been found badly diseased this season. (Weber)

Alabama: Leaf, fruit, blossom, crown, body, and twig blight occurred.
The sand or Pineapple pear is practically immune and not included in the loss estimates. (Miles)

Illinois: Koiffer and Garber are less susceptible than other varieties.
(Anderson & Tehen)

New Mexico: Much less severe than last year. All pear orchards that were badly blighted were pulled up in spring. Blight was carefully cut out under supervision of a hired inspector. (Crawford)

Idaho: Due to the exceptionally dry season, there was less of this disease than usual. (Hungerford)

California: General except near coast. Outbreak in Santa Clara Valley this year. (Horne)

Recent literature

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Pear - Leafblight; Leafspot; Weather injury; Other diseases

LEAFBLIGHT CAUSED BY *PARAEA MACULATA* (LEV.) ATK.

Apparently leafblight was important in only three states. In Delaware and New Jersey it was said to be serious in unsprayed orchards on both leaves and fruit, and caused a loss of 6% in the former state, and 20% in the latter. Defoliation was very prevalent during August in Delaware, where spraying of pear trees is generally neglected, according to Adams. Temple and Jehle estimated a loss of 5% for Maryland. McClintock reported that in Tennessee leafblight was serious on nursery trees, especially on French and American stocks, while Chinese and Japanese varieties were not so badly affected. In Alabama also it was serious on nursery stock, but was otherwise unimportant. Other states reporting the disease are Connecticut, Pennsylvania, West Virginia, Illinois, and Michigan.

Dates of first appearance reported are May 28, Kent County, Delaware; June 6, New Haven County, Connecticut; August 2, Blair County, Pennsylvania; and August 8, Burlington County, New Jersey.

LEAFSPOT CAUSED BY *MYCOSPHAERELLA SENTINA* (FR.) SCHROET.

Leafspot was reported from New York, New Jersey, Pennsylvania, Delaware, Virginia, Alabama, Ohio, Illinois, Michigan, and Kansas. While it was said to be more common than usual in Illinois and Michigan, the loss caused was only a trace. No loss higher than this was estimated in any state. In New Jersey it was said to be severe in some orchards. Fromme stated that it was prevalent on unsprayed trees at Winchester, Virginia. In Alabama it was unimportant except locally in nurseries. Sand and Kieffer nursery stock were apparently very susceptible, according to Miles. Anderson and Tehon reported that it was not at all serious on Kieffer in Illinois.

Dates of earliest appearance reported are June 12, Dutchess County, New York; June 29, DeWitt County, Illinois; July 3, Burlington County, New Jersey.

WEATHER INJURY

Frost injury to blossoms caused loss in New Mexico and Idaho. A loss of 25% was estimated in New Mexico. Some orchards were saved partially by the use of smudge pots, according to Crawford. Frost banding of fruit was reported from Washington. Other states reporting frost injury are West Virginia, North Carolina, Arkansas, Michigan, Kansas, and Arizona.

Winter injury - Severely cold temperatures during January 1924 killed 50% of the pear blossoms in Illinois. (Anderson & Tehon)

Leaf burning due to drought and high temperatures - Washington.

OTHER DISEASES AND INJURIES

Armillaria mellea (Vahl) Quel., mushroom rootrot - Mississippi.

Bacterium tumefaciens EFS. & Town., crown gall - Florida, New Mexico.

Botrytis cinerea Pers., fruitrot - Washington, attacks fruit still on trees. (Hoald)

Pear - Other diseases; Literature

- Cephalothecium roseum Cda., pinkrot - following scab in Illinois.
Cercospora sp., loafblotch - caused some defoliation in Florida. (Weber)
Chlorosis due to excess of lime - Texas.
Corticium stevensii (Noack) Durt. hypochnose - Alabama
Diplodia sp., twilight - caused extensive dieback of twigs and some large branches in Florida; usually attacking the weaker portions of the trees. (Weber)
Gymnosporangium sp., rust - West Virginia, Illinois.
Measles, cause undet., was reported by Weber from Florida. This seems to be the first report of the finding of measles on pear.
Nectria galligena Bres., European canker - Washington.
Ozonium omnivorum Shear, roctrot - caused a loss of 4% in Texas, and 2% in Arizona.
Physalospora cydoniae Arn., blackrot - Delaware, West Virginia, Arkansas, Illinois, Michigan.
Roughbark disease, probably physiological - Washington.
Septobasidium retiforme (Berk. & Curt.) Pat., canker - Alabama, Texas.
Spray injury - due to Bordeaux, Connecticut; to lime-sulfur, New York, Washington.

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 (*Coniothecium* sp.)

QUINCELEAFBLIGHT CAUSED BY *FABRAEA MACULATA* (LÉV.) ATK.

Leafblight was reported from Connecticut, New York, New Jersey, Pennsylvania, Delaware, West Virginia, Kentucky, Tennessee, South Carolina, Alabama,

Quince - Leafblight; Fireblight; Other diseases

Indiana, Illinois, and Michigan. It was not regarded as important in any of these states although a loss of 2% was reported from Pennsylvania and 1% from New York. In the latter state spores of the fungus on old leaves which were wintered outside appeared to be mature about June 1. Dates when the disease was first observed were May 6, Oconee County, South Carolina; June 10, Tippecanoe County, Indiana; and July 22, Burlington County, New Jersey.

FIREBLIGHT CAUSED BY BACILLUS AMYLOVORUS (BURR.) TREV.

Fireblight was reported from Connecticut, New York, New Jersey, Pennsylvania, Delaware, West Virginia, Alabama, Louisiana, Texas, Arkansas, Ohio, Illinois, Michigan, and Kansas. Losses estimated were 3% in Michigan, and 1% in New York, West Virginia, and Illinois. In Arkansas 1924 was said to be "the worst year for fireblight in many years." Stokdyk reported 2% injury in some plantings in Kansas. Dates of earliest reported appearance in 1924 were June 10, Randolph County, Illinois; June 16, Middlesex County, New Jersey; June 25, Sussex County, Delaware; and July 20, Wayne County, New York.

OTHER DISEASES

Bacterium tumefaciens EFS. & Town., crown gall - New Jersey.

Glomerella cingulata (Stonem.) Spauld. & Schrenk, bitter rot - Kansas.

Gymnosporangium sp., rust - New Hampshire, Connecticut, New York, Pennsylvania (loss for state 3-4%; the fruit in one twenty-acre orchard was completely destroyed by this disease - Orton & Kirby), Delaware, West Virginia (very few quinces raised but fruit infection unusually severe; loss 3% - Giddings), Kentucky, Alabama, and Kansas.

Phoma pomi Pass., fruitspot - Always present in Adams County, Pennsylvania, but this year of less importance due to dry summer. (Walton)

Physalospora cydoniae Arn., blackrot - Fruitrot always present and generally troublesome in southeastern Pennsylvania where most of the quinces in state are grown. Insect punctures are generally responsible for invasion of fungus. (Walton)

DISEASES OF STONE FRUITS

PEACH

BROWNROT CAUSED BY SCLEROTINIA CINEREA (BON.) SCHROET.

In general, peach brownrot appears to have been less injurious than during 1923. New York, New Jersey, Delaware, Maryland, Indiana, and Arkansas report more injury, while Pennsylvania, West Virginia, Kentucky, Tennessee, South Carolina, Georgia, Ohio, Illinois, Kansas, Louisiana, and California report less.

Peach - Brownrot

Fromme reported an unusual occurrence of the blossom blight in an orchard at Leesburg, Virginia, where it caused 25% damage. In one orchard in New Jersey Carman suffered severe injury from blossom blight, while Elbertas adjoining were only slightly affected. Blossom and twigblight were reported also from Connecticut, New York, Delaware, Mississippi, Ohio, and Illinois. According to Hutchins there was much less fruitrot than usual in Georgia; whereas Weber stated that it was very destructive in Florida.

Table 19. Estimated losses from brownrot as reported by collaborators, 1924.

Percentage: States reporting		Percentage: States reporting	
loss	:	loss	:
*30	: South Carolina	3	: Connecticut
10	: Alabama	2.5	: Pennsylvania
8	: New Jersey, North	2	: Michigan, Ohio, New
	: Carolina		: Mexico
7	: Maryland, Arkansas	1.5	: Texas, Delaware
6	: Virginia	1	: Kansas, Illinois,
5	: Louisiana, Georgia		: New York
4	: Kentucky, Mississippi:		

Dates and counties of earliest reported appearance, 1924.

May 7	Virginia	Loudoun	June 2	New Jersey	Burlington
May 12	Indiana	Warrick	June 16	Connecticut	New Haven
May 22	Pennsylvania	Franklin	June 17	South Carolina	Oconee
May 28	Delaware	Kent	June 17	New York	Ontario
May 29	Illinois	Pulaski	July 1	Mississippi	Oktibbeha
June	Tennessee	Knox	July 10	New Mexico	Dona Ana

It is evident that dry weather during the summer was a very important factor in reducing the amount of loss from brownrot in the 1924 season. This was stated to be the case in a number of states in which damage due to brownrot was comparatively slight, including Pennsylvania, West Virginia, Tennessee, Louisiana, Ohio, Illinois, and California. Ludwig reported that in South Carolina, "At Clemson College Mayflowers were damaged more than Elbertas, as drier weather had set in by the time the Elbertas were ripening." In Pennsylvania, according to Orton and Kirby, "Greatest loss occurred in early varieties; Red Bird is very susceptible." Collaborators in Kentucky and Arkansas also stated that brownrot was less prevalent on late varieties; on the other hand late varieties were most affected in New Jersey.

There are no special statements given concerning control, but Neal in Mississippi reported that where spraying was thorough and timely the disease was rare; and Stokdyk said that spraying held it in check in Kansas. A number of reports state that brownrot was severe in unsprayed orchards. The quotation from New Jersey given below is of interest in this connection.

New Jersey: In Cumberland County a severe hail storm was experienced in July. As soon as the storm was over one orchard was dusted

Peach - Brownrot; Leafcurl

with an 80-20 dust at the rate of a quarter of a pound to the tree. Two days were required to cover about 340 acres. In this orchard the owner states that there was not more than 4 or 5% brownrot although more than that amount fell to the ground. In an adjoining orchard which was not dusted until several days after the storm at least 20% of the fruit rotted on the trees and at least 50% fell to the ground. (Dept. Pl. Path.)

Delaware: Apothecia mature May 2: infection of young fruit general in many orchards May 28. Developing fruit showed infection resulting from curculio injury during June. (Adams)

Illinois: Conditions seemed very favorable for the development of brownrot until within two or three weeks of harvest. It is probable that the dry weather before harvest aided materially in reducing losses from brownrot. (Anderson)

California: Very rare this year. Occurs near the coast and in decreasing abundance to the great valleys, in spring as a blossom blight and canker and in fall as a fruitrot. (Horne)

Recent literature

Barss, H. P. Brownrot and related diseases of stone fruits in Oregon. Oregon Agr. Exp. Sta. Circ. 53: 1-18. 1923.

Berkeley, G. N. Brown rot of stone fruits. Canadian Hort. 47: 165. July 1924.

Ezekiel, Walter N. Presence of the European brown-rot fungus in America. (Abstract) Phytopath. 15: 55. Jan. 1925.

Fant, G. W. The brown rot canker and twig blight of the peach. Ann. Rept. New Jersey Agr. Exp. Sta. 43 (1921/22): 547-548. 1924.

——— The manner of infection of peach twigs by the brown rot fungus. Phytopath. 14: 427-429. Sept. 1924.

Zundel, G. L. Pertinent pointers on brown rot of stone fruits. Better Fruit 18(10): 7, 25. April 1924.

LEAFCURL CAUSED BY EXOASCUS DEFORMANS (BERK.) FCKL.

The reports indicate that leafcurl was not unusually severe during the past season, except in a few states. Bennett stated that in Michigan there was the worst attack in years. In South Carolina, according to Ludwig, it was much worse than usual and was present to some extent even in properly sprayed orchards. Adams reported that bud and twig infection were very prevalent in Delaware. In Georgia there was less in the northern part of the state but somewhat more in the central part. Illinois, Kentucky, and Tennessee report very much less, and Ohio and Alabama less, than usual. In Kentucky and Tennessee there was very

Peach - Leafcurl

little even on unsprayed trees, and in Virginia the disease was not especially severe.

Table 20. Estimated losses from leafcurl as reported by collaborators, 1924.

Percentage: States reporting loss :	Percentage: States reporting loss :
*10 : Michigan	:: 2.5 : Ohio
8 : New York	:: 2 : Arkansas, South
5 : New Jersey, West	:: : Carolina, North
: Virginia	:: : Carolina
4 : Arizona	:: 1.5 : Delaware
3 : Pennsylvania, Mary-	:: 1 : Texas, Illinois
: land. Kansas	:: :

* No crop in worst affected district due to freeze.

Dates and counties of earliest reported appearance, 1924.

April 6	South Carolina	Oconee	May 13	New York	Ulster
April 15	Mississippi	George	May 22	Connecticut	New Haven
April 29	Virginia	Roanoke	May 22	Pennsylvania	Franklin
May 6	New Jersey	Cumberland	May 22	Indiana	Tipton
May 6	Delaware	Kent	June 5	Illinois	Calhoun
May 13	Ohio	Fairfield			

The relation of leafcurl to weather conditions seems to have been brought out particularly well during the past season. Guba reported that in New York, "Early spring rains were very favorable for a state-wide epidemic. There was a cool rainy period during and following the bursting of the buds." Cool wet weather just as peach buds were opening was reported from Pennsylvania, Delaware, West Virginia, South Carolina, Ohio, and Michigan. In Delaware unfavorable weather conditions prevented the timely application of the dormant spray in many orchards. On the other hand, McClintock reported that in Tennessee:

"In marked contrast to last season, the peach trees, regardless of whether sprayed or not, are practically free from leafcurl this season. Our results here check with those of Professor Mix (Kansas; sec Pl. Dis. Reporter 8: 8. June 15, 1924) relative to there being little or no rain at the time when infection was expected to occur."

In general, there seems to have been no difficulty in controlling the disease with the usual sprays, although Ludwig stated that in South Carolina it was present to some extent even in properly sprayed orchards. In both New York and New Jersey, where there was more leafcurl than usual, it was severe only where spraying was omitted or not properly done. Osman reported that in Massachusetts leafcurl was very serious in many orchards that did not receive the dormant spray because of the probability of a light crop due to winter killing of the buds. The omission of the dormant application in Pennsylvania

Peach - Leafcurl; Scab

and West Virginia also permitted the disease to become severe. In the former state it was not important except where this spray had not been given. A number of states report that leafcurl was not important in commercial orchards, or others, where thorough spraying was done.

Maryland: Bordeaux 3-3-50 + 2% oil emulsion gave 95% control. Niagara soluble sulfur 4 pounds to 10 gallons water + 2% oil emulsion gave 50% control. Checks gave 95% defoliation and no fruit. (Temple & Jehle)

Kentucky: None of the oil sprays used were found to control it. (Magill)

Recent literature

Mix, A. J. Biological and cultural studies of *Exoascus deformans*. Phytopath. 14: 217-233. May 1924.

SCAB CAUSED BY CLADOSPORIUM CARPOPHILUM THUEM.

Peach scab was generally reported about as usual. West Virginia, South Carolina, New Jersey, and Delaware report more while Ohio, Illinois, Tennessee, Alabama, and New York report less. In general it was said not to be important except in unsprayed orchards.

Kentucky: It is being controlled nearly 100% by single spray with self boiled lime sulfur when the fruit is about 3/4 inch in diameter. (Valleau)

Tennessee: Not serious even on unsprayed trees. Evidently held in check by dry weather. (McClintock)

Florida: Scab was common wherever the host plant was found; attacking the young fruit always around the stem and top portions. (Weber)

Arkansas: Not important where orchards are well sprayed. In the vicinity of Rich Mountain several small well isolated clumps of peach trees were seen and in every case scab was abundant, indicating that the disease may have come in on nursery stock or else that it is easily spread for considerable distances. (V. H. Young)

Indiana: Not serious; only cankers noted. Carried on nursery stock. Found very serious in a young orchard in Gibson County, April 25. (Gardner)

Twig infection was reported from Delaware, South Carolina, Ohio, and Indiana.

Peach - Scab; Bacterial spot

Table 21. Estimated losses from scab as reported by collaborators, 1924.

Percentage: States reporting loss	:	Percentage: States reporting loss	:
3	:	1	:
:	:	:	:
:	:	:	:
2.5	:	.5	:
2	:	:	:
:	:	:	:
:	:	:	:
:	:	:	:
:	:	:	:

Dates and counties of earliest reported appearance, 1924.

March 21	Mississippi	Newton	June 20	New Jersey	Burlington
June 3	South Carolina	Chesterfield	August 21	Delaware	Kent
June 19	Virginia	Albemarle	August 28	Illinois	Jackson

BACTERIAL SPOT CAUSED BY BACTERIUM PRUNI EFS.

Bacterial spot appears to have been more abundant than usual and is reported more injurious in Michigan, Ohio, Illinois, Kentucky, Tennessee, Georgia, North Carolina, South Carolina, Virginia, Maryland, New Jersey, and Delaware. It was reported as less injurious than usual in New York and Indiana. Other states reporting it were Connecticut, Pennsylvania, West Virginia, Alabama, Mississippi, Louisiana, Texas, Arkansas, Missouri, and Kansas.

New Jersey: In one orchard in Atlantic County bacterial spot was severe on Carman and Elberta while on Belle and Hiley only a trace was found. All trees had received the regular spray applications. Severe on Mamie Ross, heavy leaf drop. (Martin)

Delaware: Most destructive disease of peach. More on light soils. (Adams)

Virginia: Caused defoliation and dropping but did not seriously affect yield. (Fromme)

Kentucky: July defoliation of trees in certain areas in orchards. (Magill)

Tennessee: Serious in some commercial orchards causing defoliation. Appears more serious on poorer soils on tops of hills. (McClintock)

North Carolina: Is prevalent and destructive this year on Hale and Elberta varieties. (Fant)

Peach - Bacterial spot

Mississippi: Causes heavy defoliation on some trees, sometimes resulting in death of trees. (Neal & Wallace)

Ohio: Very severe in northern part of the state, especially in orchards not in perfect growing condition. (H. C. Young)

Illinois: Worst this disease has ever been. Caused loss of 25% of Hales. In one large commercial orchard in southern Illinois the Hales were 95% marked and the selling value reduced 50%. (Anderson)

There is in Illinois a specimen bearing Burrill's notes and determination dated 1912. (Anderson & Tehon)

Michigan: Unusually severe in orchards where it is present. (Bennett)

Table 22. Estimated losses from bacterial spot as reported by collaborators, 1924.

Percentage: States reporting loss	:	:	Percentage: States reporting loss	:	:
4	:	:	1	:	:
3	:	:		:	:
2	:	:		:	:
	:	:	.5	:	:
	:	:		:	:

Michigan reports no loss because the crop was killed by a freeze in the affected district.

Dates and counties of earliest reported appearance, 1924.

May 6	South Carolina	Oconee	June 9	Pennsylvania	Mifflin
May 10	Mississippi	Harrison	June 12	New Jersey	Atlantic
May 23	Louisiana	Madison	June 25	New York	Wayne
May 28	Delaware	Sussex	June 27	Arizona	Cochise
June 4	Indiana	Knox	Aug. 5	Pennsylvania	Lawrence

Susceptibility of peach varieties to bacterial spot, 1924.

State and authority	:	Varieties affected
<u>Susceptible</u>		
New Jersey - Martin	:	Carman, Elberta, Mamie Ross
Delaware - Adams	:	Elberta, Belle of Georgia, Hale
Maryland - Temple & Jehle	:	Elberta
Illinois - Anderson	:	Hale, Elberta
<u>Resistant</u>		
New Jersey - Martin	:	Belle, Hiley
Illinois - Anderson	:	Jasper, Newton

Peach - Bacterial spot; Rust

There is evidently some difficulty in controlling the disease by the use of fertilizers. Anderson stated that in Illinois, "The outstanding feature of the bacterial spot situation was the failure to control the disease by applications of nitrate in many orchards;" while in Delaware, according to Adams, "Mineral fertilizers did not control, but only replaced the loss of foliage by new growth."

RUST CAUSED BY *TRANZSCHELLIA PUNCTATA* (PERS.) ARTH.

Rust was reported from South Carolina, Georgia, Florida, Texas, Missouri, and California. Apparently in the first two states the disease was much less common than usual. According to J. C. Dunegan it was collected on the leaves of seedling peaches in the vicinity of Fort Valley, Georgia, as early as May, but had not been seen since then, although ordinarily it is abundant in that section. In South Carolina Ludwig stated, "Rust is commonly very prevalent on peach and wild cherry at Clemson College in the fall, but this season only a trace was found even after diligent search in the college orchard." On the other hand, Weber reported on October 13 that in Florida, "Rust is apparently no less severe at this time of the year than it has been in recent years. The infection is general and eventually results in the complete defoliation of the trees." In a nursery inspected by Fields at Santa Barbara, California, on September 23, rust infection was heaviest on a double-flowering peach tree about six or seven years old, but was also abundant on other peach trees about the same age.

J. C. Dunegan of the Office of Fruit Disease Investigations gives the following interesting report:

"I have never collected stages O and I on Ranunculaceae in this district (Fort Valley, Georgia) although I have looked for them every spring. The hosts themselves are apparently very uncommon in the vicinity of Fort Valley.

"Stage II has occurred in 1921, 1922, and 1923 very abundantly on all varieties of peaches. The first infections appear about the middle of August and toward the end of the season practically all the leaves are infected. A limited number of counts have revealed as many as 250 to 375 pustules on each leaf.

"In 1924 stage II was collected from the leaves of a seedling peach on May 21. The infection was quite recent as many of the peridia were not ruptured. The spores were mature however, as they germinated readily in sterile tap water. This was the earliest date I ever collected this stage and I thought we could look for widespread infection and possibly some injury, due to its early appearance, but since that date no further collections have been made.

"Stage III on peaches was not found until late in 1923, when a few pustules were observed among the uredinial sori. This stage is not very common on this host in this district.

"Stages II and III were also collected on Prunus angustifolia in 1923. The telial collections were of especial interest as the sori occurred on both sides of the leaves (i. e. amphigenous). Dr. Arthur lists it as being only hypophyllous. Specimens submitted to Dr. Diehl of the Office of Pathological

Peach - Rust; Blight; Yellows

Collections were determined as *T. punctata* but he stated they had no collections with this amphigenous character in their herbarium. Specimens of stage III which were not amphigenous were also collected from this host.

"Stage II was also collected on the leaves of *Prunus serotina* in the fall of 1923.

"I have in addition, specimens of stage II on peach leaves from Bowden, Griffin, and Woodbury, Georgia; and Uriah (near Atmore), Alabama."

BLIGHT CAUSED BY *CORYNEUM BELJERINGKII* OUD.

Interesting reports of damage caused by peachblight were received from Ohio and Michigan in 1924. In Ohio it was said by H. C. Young to be quite serious on twigs and fruit in one or two orchards along Lake Erie. In Michigan, according to Bennett, the fruitspot, leafspot, and canker were important in two orchards in Mason County. In one of these orchards, one of the few in the county in which leafcurl was satisfactorily controlled, the owner estimated his loss at two-thirds of the crop. The shothole was abundant although defoliation was not serious. However, about 25% of the twigs were killed at the time the report was made (September 1), and it was thought that there would probably not be more than 20% of clean fruit.

In Idaho, according to Hangerford, blight is one of the most important peach diseases, especially in the northern part of the state. He stated that "Where San Jose scale is present the spray for that seems to control *Coryneum* blight." Colorado and Washington also reported the disease.

YELLOWS (CAUSE UNDETERMINED)

In 1924 yellows was reported as causing a loss of 2% in Maryland, and 1% in New Jersey and Virginia. It was said also to be of some importance in New York, Delaware, and West Virginia. Reports of inspections in New Jersey and Pennsylvania are given below.

Manns and Adams report (1) that attempts to communicate yellows and little peach through inoculations of healthy trees with infusions of leaves, limbs, and fruits from affected trees were unsuccessful. The results of two years' work on the transfer of pollen seemed to indicate that pollen from yellows-affected trees is functionless.

New Jersey: In a survey of a number of peach orchards in the east Vineland section in South Jersey, the infection of yellows and little peach ran from 1% to 40%. In most cases the orchards showing heavy infection were not properly tended. The Department of Agriculture inspected 4,352 trees in this area and marked 645 as being infected with yellows or little peach. (Dept. Pl. Path.)

Pennsylvania: 674,912 trees inspected and 0.89% affected with yellows. Highest percentage of yellows found in trees 8 to 9 years of age. (McCutbin)

Peach - Rosette; Little peach; Spray injury

Literature cited

1. Manns, T. F., and J. F. Adams. (Report of) Department of plant pathology and soil bacteriology. Delaware Agr. Exp. Sta. Bul. 135: 35-46. 1924.

ROSETTE

Rosette was reported from Georgia and Florida. L. M. Hutchins of the Office of Fruit Disease Investigations furnishes the following report for Georgia:

"For the important peach producing districts of Georgia, annual losses of trees from peach rosette during recent years have been less than 0.1% of the total plantings, and may therefore be indicated by the word trace. Rosette is easily controlled by eradication. As a rule the diseased trees die during the same growing season that the characters of rosette appear, and thus natural eradication becomes an important factor in the control. In orchards where the disease is unusually severe, immediate removal of rosetted trees, followed up by similar eradications during the same and subsequent seasons, has proved very effective in control."

LITTLE PEACH

Little peach caused a loss estimated at 1% in New Jersey, and was reported also from New York, Pennsylvania, Delaware, and Michigan (See also under Yellows, New Jersey and Delaware).

SPRAY INJURY

Spray injury was reported from Connecticut, New Jersey, Delaware, West Virginia, Georgia, and Tennessee.

Connecticut: In one case used atomic sulfur and got injury but not with dry mix lime sulfur. (Clinton)

Pennsylvania: Fruit spur canker and fruitdrop, due probably to arsenicals, caused severe loss in Adams County. Bud cankers caused fruit to wither and drop. Many fruit bearing twigs killed, especially on inner branches, which will affect the 1925 crop seriously. Three year old orchards never sprayed show no sign of the trouble. Confined to orchards where arsenicals were used either as dust or spray. (Walton)

Delaware: Sulfur and arsenical sprays caused severe foliage injury. Leaves sensitive because of cool wet weather, first 6 to 8 leaves on new growth affected. Peach trees interplanted with apples where copper dust was used show severe leaf injury followed by defoliation. (Adams)

Peach - Spray injury; Weather injury.

Tennessee: Little conspicuous injury, minor injury from Bordeaux where excess of lime was used. (Hesler)

Georgia: A large amount of injury from arsenate of lead in central part of state. (Hutchins)

In the following quotation Martin and Haenseler give some interesting data concerning spray injury in New Jersey.

"Spray tests conducted the past year on three year old trees gave the following results:

"1. 1-1/2 pounds of arsenate of lead to 50 gallons of water caused very severe leaf and twig injury.

"2. The addition of 4 pounds of hydrated lime to 1-1/2 pounds of arsenate of lead in 50 gallons of water reduced the injury very slightly.

"3. A combination of 1-1/2 pounds of powdered arsenate of lead and 8 pounds of sulfur to 50 gallons of water caused injury just as severe as lead arsenate alone.

"4. In a dry mix containing 8 pounds of sulfur and 1-1/2 pounds of powdered lead arsenate the injury decreased as the amount of lime increased. Even with 6 pounds of hydrated lime, however, the injury was not entirely prevented.

"5. Increasing the amount of lead arsenate in a standard dry mix (8 pounds of sulfur, 4 pounds of lime) from 1-1/2 to 2-1/2 pounds in 50 gallons of water materially increased the amount of injury.

"6. A combination of self-boiled lime sulfur and lead arsenate used at the rate of 1-1/2 pounds to 50 gallons of mixture caused no injury to twigs or leaves.

"This trouble has been particularly severe this year. In one orchard of 40 acres every leaf had fallen by July 1 and the new and 1 year old wood was severely cankered."

WEATHER INJURY

Winter and frost injury

Injury to trees was a very serious problem during the winter of 1923 and 1924. The greatest amount appears to have occurred in the eastern central states.

In Tennessee, according to McClintock, unusually cold weather following mild weather killed a number of trees in several orchards, mostly in the peach section about Harriman and Kingston. The same combination of weather in Illinois caused a loss of trees estimated by Anderson at 10%. In Kentucky Valleau reported that 3 to 8% of the young trees were killed. Young orchards also suffered severely in Alabama and Georgia. There was more injury to the trees than usual in Arkansas. H. C. Young estimated a loss of 3% due to injury to bark and twigs, which was serious throughout the northern part of Ohio.

A number of reports have been quoted previously (Pl. Dis. Reporter 8: 8, 25. 1924)

Lee M. Hutchins of the Office of Fruit Disease Investigations, U. S.

Peach - Weather injury; Miscellaneous diseases

Department of Agriculture, gives the following valuable report on winter injury.

"In the great southern peach district, lying south of Virginia and east of the Mississippi, except during periods when brownrot is unusually severe, the greatest average annual loss attributable to a specific pathological condition is generally due to the primary and secondary effects of winter injuries to the bark of the collars and trunks of the trees. Occasionally these tree destroying injuries mount to the extent of an actual catastrophe, the most serious recent occurrence having been in the winter of 1921-22, when probably one million peach trees were killed in this area. For the section indicated, the injury is most frequent along the Coastal Plain. The orchard site is important; injury is most severe in trees on the poorer soils and it is particularly prevalent on sandy hilltop sites. No variety is immune but varietal susceptibility is marked, particularly during periods when the injuries are less severe. Of the commonly grown sorts, Carman, Alexander, Red Bird, and Mayflower are among the most susceptible to winter injuries of this type, while Hiley and Elberta (both important commercial varieties) are more resistant though they too may suffer severely at times."

Injury to the fruit buds was severe in Indiana north of Gibson County and in Illinois north of Jackson County. Gardner stated that the crop north of Gibson County was ruined. A loss of 60% was reported by Bennett from Michigan, due to the killing of the buds by winter freezing and spring frosts. In Kansas freezing killed all of the crop in the northern part of the state and half of it in the southern, according to Stokdyk. A loss of 2 to 3% was reported by Orton from Pennsylvania, where frost caused a rather severe thinning in many orchards. Crawford reported that freezing of the blossoms caused a loss of 25% in New Mexico, chiefly in the Mesilla Valley. Attempts to prevent injury by smudging were not successful, due to high winds and low temperatures. Streets reported that in Arizona, "In the higher valleys in the northern counties where few trees are found the blossoms are frequently killed by frost."

Other forms of weather injury

Drought injury, and premature dropping of the fruit due to dry weather, were important in Texas, according to Taubenhaus. Clinton reported that drought injury in 1923, with subsequent winter injury, caused the death of a large number of twigs in some orchards in Connecticut. He stated also that imperfect pollination due to cool wet weather at blossoming time caused much fruit to drop later, but there was a fair set in most places.

OTHER DISEASES AND INJURIES

Armillaria mellea (Vahl) Quél., rootrot - Texas.

Bacterium tumefaciens EPS. & Town., crown gall - Very destructive in some orchards in South Carolina, according to Ludwig; reported by Hosler as killing 50 trees and injuring others in one orchard in Tennessee; serious in nursery stock in Mississippi and Indiana; also reported from Louisiana, Texas, and Arizona.

Peach - Miscellaneous :

- Botrytis sp. has been described as causing fruitrot on Elberta and Lovell peaches shipped from California. (3)
- Cercospora persicae Sacc., frosty mildew - Florida.
- Chlorosis due to excess of lime - Texas.
- Copper wire injury - In Delaware where copper wire was used for caging peach trees soluble copper caused complete defoliation (Adams).
- Diplodia natalensis Ev., footrot - The cause of considerable trouble with the dying of nursery stock and young trees set in the groves in Florida. (Weber)
- Glomerella cingulata (Ston.) Spauld. & Schrenk - Caused severe rotting of nearly mature fruit in one locality in Florida. (Weber)
- Heterodera radicicola (Goebel) Muell., rootknot - Destroyed a 25 acre orchard near Bennettsville, South Carolina, but such severe damage is uncommon, according to Ludwig; also reported on shipments of nursery stock in Mississippi, and from Florida and Texas.
- Ozonium omnivorum Shear, rootrot - Texas, peach apparently highly resistant. (Taubenhaus)
- Phoma persicae Sacc., canker - On nursery trees from Waynesboro, Virginia. (Fromme)
- Rhizopus sp., fruitrot - Very serious on fruit, especially Hale, in transit and market, in Illinois. Over 50% of the rot reported on peaches originating in Illinois is due to this fungus, which was unusually serious this year, in the orchard as well as on harvested fruit, on account of the large number of cracked peaches and split seeds (Anderson (1)). Also reported from Washington.
- Rootrots - In Arkansas numerous specimens sent in from orchards on new land particularly show rootrot. (Dept. Pl. Path.)
- Sphaerotheca pannosa (Wallr.) Lév., powdery mildew - Connecticut, New York, Pennsylvania, Virginia, Texas.
- Valsa leucostoma (Pers.) Fr., dieback - Pennsylvania (at State College on neglected trees injured by borers - Orton), Illinois.

Recent literature

1. Anderson, H. W. Rhizopus rot of peaches. Phytopath. 15: 122-124. Feb. 1925.
2. Haenseler, C. M. A new peach wilt disease. (Verticillium sp.) Ann. Rept. New Jersey Agr. Exp. Sta. 43 (1921/22): 568. 1924.
3. Lindegren, C. C., and Dean H. Rose. Two hitherto unreported diseases of stone fruits. Jour. Agr. Res. 28: 603-605. May 10, 1924.
4. Smith, C. O. The study of resistance to crown gall in Prunus. (Abstract) Phytopath. 14: 120. 1924.

PLUM AND PRUNEBROWNROT CAUSED BY *SCLEROTINIA CINEREA* (BON.) SCHROET.

Brownrot is by far the most injurious disease of plum and prune. It was very generally reported from all sections except the Pacific Northwest, and was mentioned specifically as the most important plum disease in Wisconsin, Minnesota, Kansas, and Arkansas. New Jersey, Delaware, Ohio, Illinois, Wisconsin, and Iowa reported more damage than usual, while Louisiana, Minnesota, and the group of states including West Virginia, Kentucky, and Tennessee reported less. The disease was very serious in Iowa, causing total loss of the crop in some sections, especially the southeast part, according to Bortor. H. C. Young reported that in Ohio, "Thorough spraying was necessary to control it this year," and in Illinois, Anderson stated that brownrot was serious even in many sprayed orchards. In most of the states reporting no more or less than usual, the disease was still of considerable importance, at least locally.

Table 23. Estimated losses from brownrot as reported by collaborators, 1924.

Percentage: States reporting loss	:	:	Percentage: States reporting loss	:	:
25	:	:	4	:	:
20	:	:	3	:	:
15	:	:	2	:	:
11	:	:	1.5	:	:
10	:	:	1	:	:
7.5	:	:		:	:
7	:	:		:	:
5.5	:	:		:	:
5	:	:		:	:

Blossom Blight was reported from Alabama, Michigan, Minnesota, and Wisconsin. Twigblight was said to be severe in many home orchards in Illinois, and was reported also from Ohio, Wisconsin, and Minnesota. In Florida the fungus caused a dieback of the young twigs of *Prunus umbellata*, and attacked the leaves and fruit also.

Mature apothecia of the fungus were found on April 7 at State College, Pennsylvania; April 29 at University Farm, Minnesota; May 5 at Madison, Wisconsin; and May 12 in Michigan and in Houston County, Minnesota.

Wet weather during May and June is believed by Anderson to be responsible for the severity of the disease in Illinois. Weather conditions in Michigan and Ohio were said to be favorable for brownrot as far as moisture was concerned, but the temperature was too low for its greatest development. Dry weather was mentioned as a factor in reducing the amount in West Virginia and Tennessee.

The following quotations give comments of collaborators on varietal susceptibility and on control. It will be noted that Minnesota and North Dakota both report sand cherry (*Prunus besseyi*) hybrids as attacked.

Wisconsin: Orchards sprayed with lime-sulfur had little loss. Put on

Plum - Brownrot; Black knot; Leafspot; Pockets

one extra spray as fruit started ripening. (Vaughan)

Minnesota: Sand cherry hybrids very susceptible. Susceptibility varies with variety in Japanese and American plums. (Sect. Pl. Path.)

North Dakota: "Sapa" (P. besseyi X P. salicina) and "Hansen" found attacked, and "Compass cherries" (P. besseyi X P. hortulana mineri). (Weniger)

Kansas: Good control when sprays were properly applied. (Stokdyk)

BLACK KNOT CAUSED BY PLOWRIGHTIA MORBOSA (SCHW.) SACC.

Black knot was reported from twenty-four states.

Kentucky: It was more prevalent than usual on Damson plums. Also found on Green Gage and Lombard. (Valleau)

Illinois: More specimens sent in this season than in all previous seasons combined. While I have not seen the disease in the field I am certain from the reports that it must be unusually severe this year. (Anderson)

North Dakota: Found on Prunus americana, P. besseyi, P. virginiana, and P. pennsylvanica. (Weniger)

LEAFSPOT CAUSED BY COCCOMYCES PRUNOPHORAE HIG.

Leafspot was reported from New York, Delaware, Pennsylvania, Florida, Alabama, Arkansas, Ohio, Illinois, Michigan, Wisconsin, Minnesota, Kansas, and Montana. New York and Michigan each reported a loss of 1%. Vaughan stated that in Wisconsin it was worse on European than on Japanese plums. Coccomyces sp. on Wildgoose plum (Prunus munsoniana) was reported from Arkansas.

POCKETS CAUSED BY EXOASCOUS PRUNI FCKL. AND E. COMMUNIS SADEB.

Plum pockets was reported from New York, West Virginia, Florida, Texas, Ohio, Michigan, Wisconsin, Minnesota, Iowa, North Dakota, South Dakota, Kansas, and Colorado. There was more than usual in Minnesota and Kansas, and less in New York, Iowa, and North Dakota. Specimens of E. pruni were sent in from New York and Wisconsin.

Florida: Exoascus communis was very serious on both fruit and leaves of wild plums (Prunus umbellata). The fruit was almost 100% infected, also a large number of small twigs were attacked. (Weber)

Minnesota: Serious in some local areas; varieties from the Prunus niger group more seriously damaged. (Sect. Pl. Path.)

Plum - Leafcurl; Bacterial spot; Weather injury

North Dakota: Wild plums, choke cherries, and cultivated hybrids of these as grown in state, all equally susceptible. (Weniger)

LEAFCURL CAUSED BY EXOASOUS MIRABILIS ATK.

Anderson and Tehon of Illinois report leafcurl common on hortulana plums in McDonough County. This is the first record for western Illinois. It was also reported from Georgia on Prunus angustifolia.

BACTERIAL SPOT CAUSED BY BACTERIUM PRUNI EFS.

Bacterial spot was reported as more injurious than usual in Michigan, where it caused a loss of 1%, and in Delaware, and Illinois. Other states reporting the disease are New York, Pennsylvania, Tennessee, Florida (on Prunus umbellata), Alabama, Mississippi, Louisiana, Texas, Ohio, and Indiana.

Delaware: Shoot infection more progressive than on peach; on neglected trees killed back to first year wood. (Adams)

Florida: Bacterial spot was sent to the laboratory attacking half grown fruit of Prunus umbellata forming large brown spots; not common. (Weber)

Illinois: The Burbank less diseased than others. (Anderson & Tehon)

Tennessee: Reported as more serious on higher soils of low fertility. (McClintock)

WEATHER INJURY

Frost injury

Stokdyk stated that frost killed the plum crop in some parts of Kansas, while other sections were free from it. A loss of 10%, due to freezing of the blossoms, was reported from New Mexico. Prunes in the southwestern portion of Idaho, and in the Walla Walla section of Washington, were injured by spring frost which reduced the crop. In some orchards in the latter section heating resulted in a good average crop. Frost injury was reported also from West Virginia, Michigan, Minnesota, and South Dakota.

Drought injury

Hungerford reported leafroll and fruitdrop, probably due to lack of moisture, as very important in Idaho.

The following interesting quotation is from the Division Letter of the Fruit and Vegetable Division of the Bureau of Agricultural Economics (5: 433-434.. Sept. 19, 1924)

Plum - Weather injury; Other diseases

"Drouth was the principal factor in reducing the grade of fresh Italian prune shipments from points in western Washington and Oregon this summer. It caused four practically distinct types of injury:

"First, - gum spot, beneath which was found a crescent scar $1/4$ to $3/8$ inch long. This type of injury was most common.

"Second, - shriveling of the prune $1/4$ to $1/3$ of its length from the stem end, with browning and blackening of the underlying flesh as a result of oxidation. According to Dr. Zeller, of the Oregon Experiment Station, this is an excellent demonstration of the manner in which the leaves draw water from the fruit in case of shortage, removing it from the tissue near the stem end first. This type of injury, though not so common as the gum spot, was the most serious from the standpoint of injury to the individual fruit, prunes so affected being practically worthless as fresh fruit.

"Third, - shriveling on the cheek of the prune, with brown lines of injured tissue extending through the flesh beneath. This was a less serious form of injury than the stem end shriveling.

"Fourth, - browning of the cells lining the pit cavity. This type of injury carried no exterior manifestation and apparently did not injure the eating quality of the fresh fruit, but it did make buyers fearful of the carrying quality of crops so affected.

"As with other fruits in other regions, soil types, topography, and orchard practices were important factors in drouth injury. Some orchards would show mostly one type of injury, some another, and many were practically free from any form of injury.

"It is interesting to note that men associated with the prune drying industry were not so concerned over the various forms of drouth injury as were those interested in fresh prune shipments. One of the former remarked that one good rain before the start of picking for drying would flush the injured tissue, so that practically none of it would be noted in the dried product."

OTHER DISEASES AND INJURIES

Bacillus amylovorus (Burr.) Trev., fireblight - Ohio, South Dakota.

Cladosporium carpophilum Thuem., scab - New York, Pennsylvania, Delaware, Minnesota.

Chlorosis due to excess of lime - Texas.

Diplodia pruni Fockl., gummosis - Serious in Florida on Prunus umbellata in the vicinity of Gainesville and also at DeFuniak Springs, where it killed trees several years old. (Weber)

Fruitdrop - Idaho (see drought injury), Washington.

Ozonium omnivorum Shear, rootrot - Caused a loss of 3% in Arizona. (Streets)

Podosphaera oxycanthae (Fr.) D By., powdery mildew - Florida, causing a definite twilight on Prunus umbellata, apparently much more virulent than is usually the case for this fungus, younger parts attacked, becoming swollen and deformed and gradually killed. (Weber)

Roughbark (nonpar.) - Washington
Septobasidium retiforme (Derk. & Curt.) Pat., canker - Alabama.
Silver leaf (undet.) - Washington, diagnosis based on foliage symptoms only. (Dept. Pl. Path.)
Tranzschelia punctata (Pers.) Arth., rust - Alabama, Texas.
Valsa leucostoma (Pers.) Fr., dieback - New York, Texas.
Yellows (undet.) - Delaware.

Recent literature

- Arnaud, Gabriel. Sur deux champignons parasites des pruniers dépérissants. (Two fungi connected with dieback on plum trees). Rev. Path. Veg. et Entom. Agr. 10: 346-350. Oct.-Dec. 1923.
Valsa leucostoma (Pers.) Fr., and Eutypella prunastri (Pers.) Sacc. (Valsa prunastri (Pers.) Fr.)
 Brooks, Charles, and D. F. Fisher. Prune and cherry brown-rot investigations in the Pacific Northwest. U. S. Dept. Agr. Bul. 1252: 1-21. 1924.
 Fisher, D. F., and Charles Brooks. Control of brown rot of prunes and cherries in the Pacific Northwest. U. S. Dept. Agr. Farmers' Bul. 1410: 1-12. 1924.
 Young, Paul A. Red plum curl (caused by Eriosea mirabilis Atk.) Phytopath. 14: 126. 1924.

CHERRY

BROWNROT CAUSED BY SCLEROTINIA CINEREA (BON.) SCHROET.

Brownrot was reported as more injurious than usual in Pennsylvania, Virginia, Ohio, Illinois, Michigan, and Iowa.

Connecticut: Reported on sweet cherry, sour cherry (English Marengo), and on Chinese cherry (Prunus tomentosa) which is a new host in this state. (Clinton)

New York: On sweet and sour cherries. Blossom, leaf, and twigblight in some sections. (Guba)

New Jersey: In several instances very little rot was observed on trees sprayed with dry mix. On unsprayed trees 75% of the fruit rotted. (Martin)

Pennsylvania: Much more than usual; prevalent everywhere throughout state. Early wet weather must have resulted in sepal infection which later became source of conidial infection of fruit. Both sweet and sour cherries suffered heavy losses. First noticed June 12, in Philadelphia County. (Orton)

Cherry - Brownrot; Leafspot

West Virginia: Dry season, little rot, heavy crop. (Sherwood)

Kentucky: Very little fruitrot on trees; some after picking. (Valleau)

Florida: Caused dieback of young twigs of Prunus virginiana. (Weber)

Arkansas: Sweet cherries as a whole much more susceptible. Certain varieties like Royal Anne very susceptible; unsprayed trees showing almost complete loss. (Dept. Pl. Path.)

Ohio: Most serious on sweet cherries and where sour cherries were harvested late. (H. C. Young)

Illinois: Very important in northern part of state. Notes on commercial orchards examined actually indicate 16% diseased fruit. (Anderson & Tehon)

Wisconsin: Found attacking green fruit of sour cherry. (Vaughan)

Table 24. Estimated losses from brownrot as reported by collaborators, 1924.

Percentage: States reporting		Percentage: States reporting	
loss	:	loss	:
20	:	3	:
10	:	2	:
5	:	1	:
4	:	.5	:
3.5	:		:

LEAFSPOT CAUSED BY COCCOMYCES HIEMALIS HIG.

Cherry leafspot was quite generally reported as unusually severe. This was the case in New York, New Jersey, Delaware, Pennsylvania, Virginia, Kentucky, Ohio, Indiana, Illinois, Wisconsin, and Iowa. Some collaborators stated that the disease became more severe after the fruit was picked.

New York: Infection severe where petal fall and shuck fall applications were not applied. (Guta)

Pennsylvania: Usually important in unsprayed orchards, except in Adams County. General in state, but stated by Walton to be especially severe in Adams County. Apparently more important this year on sour cherries if number of reports is indicative. (Orton)

Delaware: Sour cherry completely defoliated July 10; neglected trees generally defoliated. (Adams)

Kentucky: Defoliation in July. (Valleau)

Wisconsin: Little developed until after harvest. (Vaughan)

Cherry - Leafspot

Table 25. Estimated losses from leafspot as reported by collaborators, 1924.

Percentage: States reporting loss	:	:	Percentage: States reporting loss	:
9	: Ohio	::	3	: Kansas
5	: New Jersey, Michigan,	::	2	: New York
	: Iowa, Nebraska	::	1.5	: Pennsylvania,
4.5	: Arkansas	::		: Illinois
4	: Kentucky	::	.5	: Delaware
	:	::		:

Dates and counties of earliest reported appearance, 1924.

May	Tennessee	Kaib	June 12	New Jersey	
May 6	Delaware	New Castle	June 19	Ohio	Montgomery
May 28	Pennsylvania	Delaware	June 21	Virginia	Henrico
June 5	New York	Dutchess	July 9	Indiana	Orange
June 10	Illinois	Jackson			

Control

New Jersey: Unsprayed trees in Burlington County completely defoliated. In adjoining orchard of 2500 trees sprayed with dry mix lime sulfur only 25% defoliation. In other orchards sprayed with dry mix lime sulfur trees were heavily defoliated. (Martin)

Pennsylvania: Spraying did not check it effectively in Adams County except when very thoroughly done according to R. C. Walton. (Orton)

Delaware: Spraying gives practical control. (Adams)

Tennessee: Well controlled in commercial orchards. (McClintock)

Wisconsin: Thorough control by spraying. Lime-sulfur more particular to use than Bordeaux; latter usually gives best control. (Vaughan)

Keitt and Jones (2), report that at Sturgeon Bay, Wisconsin:

"Although ascospore discharge of the cherry leaf spot fungus began by May 14 and discharges occurred frequently thereafter, no disease was observed until June 25. Studies showed that this infection was occasioned by ascospores discharged June 15. Although numerous moist periods occurred in early spring, infection by the cherry fungus was delayed until higher temperatures prevailed, little injury occurring even on unsprayed trees before harvest. Later, however, unsprayed trees were severely infected."

These studies indicate that in this section it is unnecessary to apply the preblossom spray formerly considered essential in the control of this dis-

case (1). Such data is of great value in determining the proper times for spray applications.

FROST INJURY

Wisconsin: Ten percent injury on Early Richmond, practically no injury on Montmorency which fruited very heavily so that the total crop was more than ever before. (Vaughan)

Ohio: Some orchards suffered severely. (H. C. Young)

Illinois: Sweet cherries in the Cominsville district showed about 60% fruit buds killed. (Andersen & Tehon)

New Mexico: Fifteen percent freezing of blossoms. (Crawford)

Washington: Crop is sharply reduced in quantity in eastern and central Washington because of spring frosts. The weakening and killing of trees in a number of cases is also noted. (Dana)

Frost injury was also reported from Michigan, Kansas, and Idaho.

OTHER DISEASES AND INJURIES

Alternaria sp., fruitrot - Reported by Lindegren and Rose (3) on sweet and sour cherries from Michigan, Idaho, and Washington, at the Chicago market.

Armillaria mellea (Vahl) Quel., rootrot - Washington; Michigan "In one orchard of 3500 trees ten years old, there was a loss of 50 trees in one portion near a woodlot. Replanted trees 5 years old also killed in some cases. Reports like this of loss of trees here and there in settings on newly cleared land come in each year." (Coons)

Bacterium cerasi F. L. Griffin, bacterial gummosis - Montana, Washington.

Bacterium pruni EFS., bacterial spot - New York

Bacterium tumefaciens EFS. & Town., crown gall - Washington

Cladosporium carbonophilum Thuem., scab - Iowa, Washington.

Corvoneum beijerinckii Oud., blight - Washington

Exoascus cerasi (Fckl.) Sadeb., witches' broom - Washington

Glassy fruit (nonpar.) - Washington

Gummosis (nonpar.) - Washington

Leaf crinkle (cause unknown, probably soil deficiency) - Noted in several orchards in Lewiston region of Idaho. Leaves have somewhat the appearance of mosaic-infected plants (Hungerford).

Phomopsis padina (Sacc.) Died., twigblight and limb canker - Pennsylvania, on sour cherry.

Podosphaera oxycanthae (Fr.) D By., powdery mildew - Vermont, New York, Tennessee, Iowa, Colorado; on Prunus virginiana in Pennsylvania; on P. demissa, Washington.

Flowrightia morbosa (Schw.) Sacc., black knot - Connecticut on choke cherry and wild cherry, New York, Delaware, Pennsylvania, West

Cherry - Diseases. Apricot

Virginia, Tennessee, Michigan, Wisconsin on wild cherries only, North Dakota (see plum), and Idaho.
Rhizopus nigricans Ehr., fruitrot - Caused some injury in Washington. (Dana)
Tranzschelia punctata (Pers.) Arth., rust - South Carolina, on wild cherry; Missouri, on Prunus serotina.

Recent literature (see also under peach and plum)

Cited

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3. Lindegren and Rose, see peach.

Not cited

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APRICOT

Bacillus amylovorus (Durr.) Trev., fireblight - Texas.
Bacterium pruni EFS. bacterial spot - Texas.
Bacterium tumefaciens EFS, & Town., crown gall - Caused a loss of 2% in Arizona (Streets).
Cladosporium carbonophilum Thuem., scab - Caused a loss of 1% in Texas. (Taubenhaus)
Coryneum beijerinckii Oud., blight - Most important disease of apricots in Idaho. (Hungerford)
Cylindrosporium padi Karst., leafspot - Texas.
Fusicoccum sp., canker - Common on neglected trees in pasture in Monroe County, New York. (Guba)
Sclerotinia cinerea (Don.) Schreket., brownrot - Connecticut.

Recent literature

Faës, Henry, and M. Staehelin. La maladie des abricotiers dans le Valais. Compt. Rend. Acad. Agr. France 10: 427-428. April 1924.

Apricot -- Grape - Blackrot

Faës, Henry, and M. Staehelin. La maladie cryptogamique des abricotiers en Valais. Ann. Agr. de la Suisse 1923: 22 pp. 1924.

Stromatinia (sclerotinia) laxa, thought by some to be only a specialized form of Sclerotinia cinerea.

Foex, E., L. Guyot, and A. Paillot. Quelques précisions sur le Monilia de l'abricotier. Pomol. Franc. p. 111-115, June 1924.

Khazanoff, Amram. A new tumor of the apricot. Jour. Agr. Res. 26: 45-60. 1923.

(Monochaetia rosenwaldia Khazanoff)

DISEASES OF SMALL FRUITS

GRAPE

BLACKROT CAUSED BY GUIGNARDIA BIDWELLII (ELL.) VIALA & RAVAZ

Blackrot was reported as causing more loss than in 1923 in Michigan, Indiana, Ohio, Kentucky, Alabama, New Jersey, and Delaware, while in Pennsylvania, West Virginia, Tennessee, and Illinois it was said to be less severe.

Delaware: Spraying young shoots four to six inches too late for control. Starting with shoots one inch long gave thorough control. (Adams)

Florida: Blackrot was the most widespread grape disease. The fungus was more destructive to the fruit than any other part of the plant but was common on leaves and stems. It was very severe on the leaves of Muscadine (*Vitis rotundifolia*), which were decidedly more spotted than those of other varieties. (Weber)

Table 26. Estimated losses from blackrot as reported by collaborators, 1924.

Percentage: States reporting loss :	Percentage: States reporting loss :
30 : Kentucky	5 : West Virginia, Ohio
25 : South Carolina	1 : Alabama, Mississippi
10 : Maryland	2.5 : Arkansas
39 : North Carolina	1 : Illinois, Wisconsin,
7.5 : Georgia	Nebraska, New Mexico
6.5 : Texas	.5 : Connecticut
6 : Delaware	
:	:

Grape - Blackrot; Downy mildew

Dates and counties of earliest reported appearance, 1924.

May 5	Georgia	Thomas	July 12	Tennessee	Hamilton
May 28	Delaware	Kent	July 24	New York	Dutchess
June 5	South Carolina	Chesterfield	July 26	New Jersey	Middlesex
July 3	Illinois	Madison	July 28	Connecticut	Middlesex
July 7	Indiana	Greene	Aug. 2	Pennsylvania	Perry

Recent literature

Rhoads, A. S. Grape diseases, with special reference to black rot and anthracnose. Quart. Bul. Florida State Plant Board 8: 102-112. July 1924.

DOWNY MILDEW CAUSED BY PLASMOPARA VITICOLA (BERK. & CURT.) BERL. & DETONI

Downy mildew was reported as more prevalent than usual in Ohio, Illinois, Michigan, Wisconsin, Iowa, New Jersey, and Delaware. In most of these states, however, it was not important on sprayed vines. Other states reporting it are Connecticut, New York, Maryland, West Virginia, Florida, Kentucky, South Carolina, Alabama, Texas, Arkansas, Indiana, Minnesota, Missouri, and Kansas.

Arkansas: It was noted especially on red grapes. (Dept. Pl. Path.)

Illinois: Downy mildew was serious this year again but was not as bad as last year. Brightons seem to be especially susceptible to downy mildew in this state. Spraying with Bordeaux according to the regular schedule seems to have controlled the disease perfectly this year. (Anderson)

Michigan: In a few vineyards the loss due to fruit attack will run as high as 10%; leaf spotting is common. (Bennett)

Wisconsin: Major disease; caused leaves to drop. Good control with Bordeaux spray. (Vaughan)

Iowa: Serious on Moore Early. (Porter)

Estimated losses reported by collaborators were Iowa, 3%; Illinois, 2.5%; Maryland and Michigan, 2%; and Wisconsin, 1%.

Dates and counties of earliest reported appearance, 1924.

June 23	Pennsylvania	Center	Aug. 10	Wisconsin	Dane
July 10	New Jersey	Gloucester	Aug. 21	Connecticut	New Haven
July 17	New York	Wayne	Sept. 30	Delaware	New Castle

Recent literature

Kotte, W. Laboratoriumsversuche zur Chemotherapie der Peronosporakrankheiten. I. Die Wirkung von Metallen und Salzen. (Laboratory experiments on the Chemotherapy of the Peronospora disease. I. The action of metals and salts.) Centralb. für Bakt., Abt. 2, 61: 11-18. 367-378. 1924.

Grape - Downy mildew; Powdery mildew; Anthracnose; Deadarm

Quinn, D. G. Downy mildew (*Plasmopara viticola*). Jour. Dept. Agr. South Australia 27: 540-550. Jan. 15, 1924.

Tonduz, P. La preparation des produits cupriques pour la lutte contre le mildiou. Terre Vaud. 16: 353-357. June 7, 1924.

White, H. G. Spraying experiments for downy mildew. Agri. Gaz. New South Wales 35: 94. 1924.

POWDERY MILDEW CAUSED BY *UNCINULA NECATOR* (SCHW.) BURR.

Powdery mildew was reported from the following states: Connecticut, New Hampshire, New York, Pennsylvania, Delaware, West Virginia, Texas, Ohio, Illinois, Michigan, Wisconsin, Iowa, and Missouri. None of them report it as important.

Literature

De Castella, F., and G. C. Brittlebank. Oidium of the Vine. *Uncinula spiralis* (Berkeley & Cooke). Jour. Dept. Agr. Victoria 21: 673-685, 738-745. 1923; 22: 98-108. 1924.

Flossfeder, F. How to control powdery mildew. Calif. Grape Grow. 5 (6): 8-9, 14. June 6, 1924.

ANTHRACNOSE CAUSED BY *GLOEOSPORIUM AMPELOPHAGUM* (PASS.) SACC.

Anthracnose was reported from Maryland, South Carolina, Georgia, Florida, Alabama, Ohio, Indiana, Illinois, Michigan, Wisconsin, and Porto Rico.

Florida: Anthracnose was a very serious disease in the state wherever grapes were grown. It appears to do the most damage to the growing shoots and to the leaves. (Weber)

Literature: see blackrot

DEADARM CAUSED BY *CRYPTOSPORELLA VITICOLA* (D. REDDICK) SHEAR

Deadarm was reported from New York, Pennsylvania, South Carolina, Ohio, and Michigan.

New York: Common in Chautauqua grape belt and in the Hudson Valley. Dead arms very apparent in the middle of June; practically every vineyard in the Chautauqua grape belt has some dead arm. (Guba)

Ohio: In scattering vineyards found many cases of new infection. (Wilcox)

Grape - Deadarm; Weather injury

Michigan: It is present in the majority of vineyards; usually not more than 1% to 2% of plants affected, but in some cases 10% to 20% of vines are diseased. (Sennett)

Literature

Hiura, M. On the dead-arm disease of grape vine in the vicinity of Sapporo. Jour. Soc. Agr. & For. Sapporo 15: 417 (i.e. 435) - 450. June 1924.
Japanese with English resume.

WEATHER INJURY

Winter injury

Severe winter injury to the vines was reported from Minnesota and Illinois. In Minnesota, according to the Section of Plant Pathology, "Winter injury is the most important factor in grape growing. Grapes in general are not hardy in this state. Some hardy varieties such as Beta were badly damaged in some places last year. The estimated reduction in yield is 15%." In Illinois a loss of about 50% was reported by Anderson.

Dr. A. C. Vogele, of the University of Illinois, has sent the following report concerning injury to grapes at the Urbana Station during the winter of 1923 and 1924.

"We had two periods of extremely low temperature, one in December and one in January. The weather of January 1924 was extremely cold, the temperature going to 18 degrees below zero on the fifth. This was the minimum temperature recorded at the University Weather Bureau. However, this cold snap was of long duration and the records show that it was below zero on January 6, 17, 18, 20, 21, 22, and 26. This long siege of sub-zero temperature with a minimum of 18 degrees below caused considerable injury to certain varieties of grapes in our vineyard at Urbana. Agawam, Lindley, Salem, and Barry were very seriously injured and produced very little fruit, that is, only a few scattered bunches. It is not uncommon to find the buds at the base and toward the middle of the canes dead, so that the only living shoots were to be found at the seventh, eighth, ninth, or tenth node. In other cases there was no localization of the injury, also in many other cases the buds made a vegetative growth but the flower parts were killed.

"The variety that was most seriously injured of all was Herbemont. Of ten vines of this variety six were killed back to the ground. The most of them made growth from adventitious buds from the crown of the vine. Carman, which was growing beside Herbemont, was not injured and produced three-fourths of a crop. Brighton and Niagara were also seriously injured, but the injury in this case was the killing of the flower parts and not of the buds themselves. All of these vines with the exception of Herbemont made a very vigorous vegetative growth this year. A second

Grape - Weather injury; Miscellaneous diseases

group of varieties which were slightly less seriously injured were Gaertner, Empire State, Lady Washington, Clinton, Bacchus, Norton, and Berckmans. The varieties in this group produced only a few pounds of grapes, and the injury here was again due to the killing of the flower parts in the buds, so that we got a large number of fruitless canes. The third group included Isabella, Eaton, King, Champion, Campbell Early, Ives, Goff, Ulster, August Giant, Iowa, Goethe. Winter injury was quite noticeable and reduced the yield to about one-third or one-half crop.

"It is interesting to note that of the newer varieties, Caco, Hubbard, and Regal stood up very well under these conditions of low temperatures and produced a very good crop for the season. Concord, Moore Early, Lottie, Worden, Delaware, and Diamond were the least affected by the minimum temperature of 18 degrees below zero.

"About the beginning of January 1925 the temperature went down for one night to 20 degrees, but the cold spell was not of as long duration as last January, which might make some difference in the winter injury for this season. Undoubtedly, however, the injury for two consecutive years will have a very detrimental effect on the varieties in the first two lists mentioned above."

Frost injury

Frost injury caused losses estimated at 2% in New Mexico, and 1% in southern Georgia, and was reported also from West Virginia, Illinois, and Kansas. In Illinois, however, more loss was caused by successive rains during the blossoming period than by frost, according to Anderson and Tchon. In Arizona frost on April 17 killed back the new shoots, but others started promptly. A loss of 2% was estimated by Streets. Frost in early fall was of considerable importance in Ohio and Michigan.

Michigan: Later maturing varieties frosted before harvest. Most damage in the northern part of the southern half of the state; 10% loss. (Bennett)

Ohio: Early varieties safe; Concord immature except on islands; Catawbas very immature; 5% loss. (Wilcox)

OTHER DISEASES

Armillaria mellea (Vahl) Quel. - Rootrot, Arkansas.

Bacterium tumefaciens EPS. & Town. - Crawford reported a loss of 1% from New Mexico, where crown gall appears to be most severe in vineyards where the crowns have been injured by cultivation. Also reported from Washington.

Chlorosis - Texas. Due to excess of lime. May be controlled by the use of iron sulfate incorporated in the soil (Tauberhaus). Illinois, associated with rootworm injury.

Hardberry (nonpar.) - Washington.

Leaf wrinkle, cause unknown - Seen on four trellises of Concord at

Grape - Miscellaneous

- Wasco, Kane County, Illinois, July 25. (Tehon & Anderson)
? Leptothyrium pomi (Mont. & Fr.) Sacc. - Flyspeck, resembling that
 caused by this fungus on apple, found at one place in Adams
 County, Pennsylvania. (Kirby)
Ozonium omnivorum Shear - Rootrot, Texas.
Rhytisma vitis Schw. - Tarspot, New York.

Literature

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Strawberry - Leafspot; Leafscorch

STRAWBERRY

LEAFSPOT CAUSED BY MYCOSPHAERELLA FRAGARIAE (TUL.) LIND.

Leafspot was reported from practically all sections of the country.

South Carolina: Common throughout state; is causing a defoliation in some fields but did not appear until picking time. No control measures are practical in this state in connection with this trouble; 5% loss. (Moore)

Alabama: Probably due to wet spring, many fields seriously affected, vines dying in some instances. (Miles)

Illinois: Unusually severe this year on account of the exceptionally wet weather in June. (Anderson)

South Dakota: Probably caused from 5% to 10% damage to the crop in some of the larger fields of the southeastern part of the state. As in previous years reported, its severity varies greatly with the variety grown. (Petty)

LEAFSCORCH CAUSED BY DIPLOCARPON EARLIANA (ELL. & EV.) WOLF

Leafscorch was reported from Indiana, Illinois, Wisconsin, and Louisiana. Gardner reported that in a field of three varieties in Indiana, this disease was severe on Gibson and absent on Dunlap and Doctor Burrill. In Illinois it was serious in some bolls in Pulaski County. It was especially serious on Klondike and was not found on Aroma in the same field according to Anderson.

Wolf (3) states that this disease is the most serious trouble of strawberries in North Carolina. Regarding losses due to it in that state, he says:

"Losses ranging from those which were inappreciable to 50% of the crop with an average of about 20%, were sustained in Columbus County in 1922 according to estimates furnished by about 200 growers..... This is regarded as representative of conditions over the entire area devoted to the culture of strawberries within the state."

According to Wolf (l. c.) it occurs in the United States in Louisiana, Delaware, New Jersey, Connecticut, Illinois, Indiana, West Virginia, New York, Maryland, Tennessee, Kentucky, Florida, Wisconsin, and Montana; in Ontario, Canada; and in Germany, France, Italy, Siberia, and Portugal. Of the two important commercial varieties in North Carolina, Klondike is very susceptible, and Missionary moderately susceptible, while of other varieties noted, Excelsior is very susceptible, Lady Thompson moderately so, and Aroma, Brandywine, and Gandy seem to be entirely free. According to data furnished Wolf by L. K. Jones, the varieties in the plantings at the University of Wisconsin may be classified as follows:

Very susceptible - Big Wonder, Charles First, Glen Mary, Peerless, Sample, Superb.

Moderately susceptible - Gibson, Black Beauty.

Slightly susceptible - Magic Gem, Paul Jones, Stevens, Uncle Jim, Sionilli.

Free - Senator Dunlap, Aroma, Brandywine, Kellogg's Premier, Progressive, Wolf, Big Late, Fun Special, Doctor Barrill, Joe, Kellogg's Prize, Merrick, Warfield.

Attempts which were made to inoculate species of *Potentilla* with this fungus were uniformly unsuccessful, and the following list of synonyms given by Wolf does not include names first applied to the organism occurring on that genus:

Leptothyrium fragariae Lib.
Gloeosporium fragariae Mont.
Ascochyta fragariae Sacc.
Ascochyta colorata Pk.

Marsonia fragariae Sacc.
Peziza earliana Ell. & Ev.
Mollisia earliana (Ell. & Ev.)
 Sacc.

FRUITROTS DUE TO VARIOUS FUNGI

Rose (6) reports that one of the most destructive diseases in the southern Mississippi Valley is leather rot caused by a fungus apparently identical with *Phytophthora cactorum* (Leb. & Cohn) Schroet. It has been found in Mississippi, Louisiana, Arkansas, Missouri, Illinois, Kentucky, and Tennessee. The two varieties, Klondike and Aroma, which are of main commercial importance in these states, are also those on which the disease was most commonly seen in the field, the former being much more severely attacked. Gandy, Missionary, and Lady Thompson are said to be apparently resistant, but are not nearly so extensively used, Gandy being grown commercially only in southern Illinois, and Lady Thompson somewhat in Arkansas and Tennessee, while Missionary was seen in only one field in Arkansas. There is a conspicuous relation to rainfall, infection only occurring during wet weather and the disease reaching a maximum within three to four days after heavy rains. Mulching the beds seems to be an effective method of control. It has been tried with good success at Beebe, Arkansas. In the district around Hammond, Louisiana, there is very little leather rot, although it receives as much rain as any other area within these states. Practically all the strawberry fields in this section are mulched.

Dodge and Stevens (7) compare the rots caused by *Rhizoctonia solani* Kuehn (*Rhizoctonia brownrot*), *Pezizella lythri* (Desm.) Shear & Dodge (tan brown rot), *Botrytis* sp. (*Botrytis brownrot* or gray mold rot), and *Phytophthora cactorum* (Leb. & Cohn) Schroet. (leather rot). The *Rhizoctonia* rot is very important in Florida. It is a much more constant source of loss than the *Botrytis* rot, which although it appears in destructive epidemics suddenly during or soon after brief rainy periods, is much less regularly present in the fields. Regarding the distribution of the first three rots the authors state that:

"The *Rhizoctonia* rot is now known from central Florida, North Carolina and possibly from Tennessee *Pezizella* rot has been observed by the writers in Cuba, Louisiana, Florida, Arkansas, Virginia, Maryland, Wisconsin, and Alaska. *Botrytis* has been found to some extent as a fruit rot of strawberries in every strawberry region visited, though it varies greatly in

Strawberry - Fruitrots; Rootrots; Miscellaneous

abundance. It is serious in Alaska and during many seasons in New England, and may become abundant in more southern regions during wet weather."

During 1924 the gray mold rot caused by Botrytis sp. was reported by collaborators from Connecticut, New York, Louisiana, Arkansas, Ohio, Indiana, Illinois, and Washington. In Ohio, according to H. C. Young, it was quite general in some sections, causing losses as high as 25%. Anderson stated that in Illinois, "It caused 50% loss in many beds; worse than ever known, due to unusually wet weather in May and June. Many fruit clusters blighted to the crown of the plant."

Pezizella rot was reported from Louisiana.

Leak due to Rhizopus nigricans Ehr. was reported by Taubenhaus as being very prevalent in Texas due to wet weather during harvest, causing a loss of 20%. Rhizopus rot occurred also in Indiana and Iowa, according to reports.

ROOTROTS DUE TO VARIOUS CAUSES

Rootrots, mostly of unknown cause although Fusarium or Rhizoctonia were associated with them in some instances, were reported from a number of states. Blackrot was reported from New Jersey, Michigan, Colorado, and Washington. Rhizoctonia was associated with it in Michigan and Washington. Berkeley and Jackson (1) state that their observations indicate that on the Niagara Peninsula there are three types of blackrot, one of them possibly caused by soil bacteria. Rootrot occurred in Massachusetts, New York, New Jersey, Pennsylvania, Arkansas, Illinois, and Kansas. Some of the comments of collaborators follow:

New York: Rather prevalent in the state. Attempts to associate a pathogene with the disease have so far proved unsuccessful, loss .7%. (Guba)

Pennsylvania: Specimens of rootrot have come in from several localities notably Blair, Indiana, and Erie Counties. Cultures indicate that a Fusarium may be the cause in many instances. The variety Premier seems to be one of the most susceptible. (Thurston)

Florida: Wilt (Fusarium sp.) was found doing considerable damage at LaBelle. The organism attacked the roots and was detected by the discoloration in the lower portion of the main root. (Weber)

Illinois: Very serious in many sections of the state. (Anderson)

OTHER DISEASES AND INJURIES

Chlorosis - Idaho, Texas (due to excess of lime, Taubenhaus)

Dendrophoma obscurans (Ell. & Ev.) H. W. Aud. - Leafblight. Was reported for the first time from Minnesota, where it was locally important. (Sect. Pl. Path.)

Frost injury - Iowa; Washington.

Strawberry - Miscellaneous--Raspberry - Anthracnose

- Heterodera radicumicola (Greef) Muell. - Rootknot, Washington.
- Sphaerotheca humuli (DC.) Durr. - Powdery mildew, New York, New Jersey, Washington. Becoming severe in eastern Washington. (Dana)
- Tylenchus dipsaci (Kuehn) Bast. - Stem nematode. On wild strawberries in the Pacific Northwest. (Godfrey and McKay (4).)
- Yellows, cause unknown.- Rather common on Minnesota No. 4 and Dunlap in Minnesota, not so common on other varieties (Sect. Pl. Path.) In Colorado several specimens and reports were received of plants turning yellow and leaves dying at the edge. No organism was found to account for the trouble. (Learn)

Recent literature

1. Berkeley, G. H., and A. B. Jackson. Strawberry black root. (Abstract). Phytopath. 14: 348. July 1924.
2. Coons, G. H. Black root of strawberry. A discussion of the disease and suggestions to growers who contemplate starting new plantings. Michigan Agr. Exp. Sta. Quart. Bul. 7: 25-26. Aug. 1924.
3. Dodge, B. O., and Neil E. Stevens. The Rhizoctonia brown rot and other fruit rots of strawberries. Jour. Agr. Res. 28: 643-648. May 17, 1924.
4. Godfrey, G. H., and M. B. McKay. The stem nematode *Tylenchus dipsaci* on wild hosts in the Northwest. U. S. Dept. Agr. Bul. 1229: 1-10. 1924.
5. Klebahn, H. *Fabraea fragariae*, die Schlauchfruchtform der *Marssonina fragariae*. (*Fabraea fragariae*, the ascigerous state of *Marssonina fragariae*.) Ber. Deutsch. Bot. Gesellsch. 42: 191-197. 1924.
6. Rose, Dean H. Leather rot of strawberries. Jour. Agr. Res. 28: 357-376. April 26, 1924.
7. Stoddard, E. M., D. H. Rose, and N. E. Stevens. Spraying strawberries for the control of fruit rots. U. S. Dept. Agr. Circ. 309: 1-4. March 1924.
8. Wolf, F. A. Strawberry leaf scorch. Jour. Elisha Mitchell Sci. Soc. 39: 141-163. April 1924.

RASPBERRYANTHRACNOSE CAUSED BY *PLECTODISCELLA VENETA* (SPEG.) DURK.

Considerable injury due to anthracnose occurred during the 1924 season, no state reporting less damage than usual, while Vermont, New York, Maryland,

Raspberry - Anthracnose

Ohio, West Virginia, Michigan, and Illinois reported more.

New York: Considerable damage noted in Ontario and Yates Counties, especially on Plum Farmer. Occurred generally on raspberries in Wayne County but of no economic importance. Very prevalent on black raspberries, doing damage to the extent of 25% in Chautauqua County. (Guba)

Ohio: Spots so numerous at base of many laterals that they made almost no growth. (Wilcox)

Indiana: Limiting factor in black raspberry industry, a rather important one in Indiana. Worse in southern end of state. Bearing canes girdled and killed prematurely, also much pedicel and berry infection. Conclusive evidence obtained that the disease is introduced into new patches with the transplants. (Gardner)

Illinois: Most important disease this season. (Anderson)

Kansas: Important in many of the older patches. (Stokdyk)

Porto Rico: On Columbia raspberry. (Cook)

Table 27. Estimated losses from anthracnose as reported by col-laborators, 1924.

Percentage: States reporting		Percentage: States reporting	
loss	:	loss	:
25	: Arkansas	5	: New Jersey, Pennsyl-
10	: Indiana, Wisconsin		: vania, Michigan
8	: Iowa	4	: West Virginia
7	: Maryland	3.5	: Illinois
6	: Kentucky	1	: New York, North Dakota
	:		:

Dates of earliest reported appearance, 1924.

April 23	New Jersey	Atlantic	June 11	Indiana	Montgomery
May 9	Ohio	Franklin	June 19	Minnesota	Hennepin
May 12	Mississippi	Lowndes	July 23	New York	Ontario
June 1	Illinois	Pike			

Varietal susceptibility and control

Colby of Illinois reports Quiller resistant (1). The variety Van Fleet developed by the United States Department of Agriculture was said to be free from the disease although other varieties growing nearby suffered injurious attacks (2).

Pennsylvania: Cumberland, Plum Farmer very susceptible, Gregg more resistant; Reds resistant. Bordeaux gave better results than

Raspberry - Anthracnose; Caneblight

lime-sulfur in Venango County. (Krout & Orton)

Indiana: Delayed dormant spray prevents the infection which later kills the canes. (Gardner)

Michigan: All black varieties very susceptible. (Dennett)

Wisconsin: Spray is important for control using either lime sulfur or Bordeaux. More on black than red raspberries. (Vaughan)

Minnesota: Especially common and severe on black caps. (Sect. Pl. Path.)

Stover gives some interesting data on control under Ohio conditions and states:

"The first new lesions appearing on plants under observation near Columbus were found on May 9 when the new shoots were six to eight inches in height. Conidia were first observed in new lesions on May 19. Such lesions were very abundant on May 23, on unsprayed canes, thirty to sixty-five percent of the canes in different check plots being infected. Plants sprayed with either liquid or dry lime sulfur showed few lesions and only two to seven percent of the canes were affected. No injury to plants sprayed with lime sulfur have been apparent on this plantation, but some burning resulted from the use of Bordeaux mixture 3-6-50. In a plantation near Lucasville, Ohio, sprayed with dry lime sulfur, many leaves on the old canes are dead, and others have turned yellow. The new growth, however, is very healthy and the leaves on the fruiting branches are not injured. Unfortunately, no check was left in this plantation, and we cannot state definitely that this appearance is the result of spraying."

Recent literature.

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2. Darrow, George M. The Van Fleet raspberry; a new hybrid variety. U. S. Dept. Agr. Circ. 320: 1-15. Aug. 1924.
3. Jones, L. K. Anthracnose of cane fruits and its control on black raspberries in Wisconsin. Wisconsin Agr. Exp. Sta. Res. Bul. 59: 1-26. May 1924.
4. Rhoads, Arthur S. Anthracnose of blackberries and raspberries: its cause and control. Ozark Fruit Grower 9(1): 3-5. 1924.

CANEBLIGHT CAUSED BY LEPTOSPHAERIA CONIOTHYRIUM (FCKL.) SACC.

Caneblight was reported from Connecticut, New Jersey, Pennsylvania,

Raspberry - Caneblight; Bluestem; Orange rust

Virginia, Ohio, Indiana, Illinois, Iowa, North Dakota, and Idaho. Losses reported were 10% in New Jersey, 2% in Pennsylvania, and one-half percent in Illinois. Kirby and Orton reported it as always important on blackcaps in Pennsylvania. At New Brunswick, New Jersey, severe infection was observed on the varieties Lathan, Count, and June, and only slight infection on Donboro, according to the Department of Plant Pathology. Van Fleet is said to be resistant to this disease also (see anthracnose). Fromme reported that caneblight caused considerable loss on Cumberland in Roanoke County, Virginia. LaFrance was the variety affected in the only report of the disease in Connecticut.

BLUESTEM OR WILT CAUSED BY *VERTICILLIUM ALBOATRUM* REINKE & BERTH.

Bluestem was reported from New York, where it caused a loss of 1%; Maryland, Ohio - on black raspberry; Minnesota - first report; and Washington - on red raspberry. Berkeley and Jackson (1) state that it is prevalent throughout the Niagara Peninsula on both red and black varieties, affecting three-fourths of the Cuthbert plantations.

New York: Causes dwarfing and wilting of one and two year old canes. Common but local due to soil infestation (relation to other crops, particularly tomato and potato). Black varieties especially susceptible. Common on one variety of reds (Owasco). Believed to be one of the principal factors causing "running out" of black varieties in New York. (Rankin)

Literature cited

1. Berkeley, G. H. and A. B. Jackson. Blue stem of red and black raspberry. (Abstract). *Phytopath.* 14: 347-348. July 1924.

ORANGE RUST CAUSED BY *GYMNOCONIA INTERSTITIALIS* (SCHL.) LAGH. AND *KUNKELIA NITENS* (SCHW.) ARTH.

Orange rust reported as due to *Gymnoconia interstitialis* occurred in Connecticut, New York, New Jersey, Kentucky, Ohio, Minnesota, and Iowa. In Pennsylvania, according to Orton, orange rust was found only on blackcaps. It was also reported from three localities in Virginia, on blackcaps and a white variety.

New York: Orange rust in black varieties is very common this year in Ontario, Yates, and Schuyler Counties where blackcaps are an important crop. It is the most important loss-factor in this crop for this area. Very little effort made at control. (Rankin)

Recent literature

Bessey, E. A. Notes on the orange rusts of *Rubus*. *Papers Michigan*

Raspberry - Crowngall; Leafcurl; Mosaic; Streak

Acad. Sci. 3: 61-66. 1924.

Dodge, P. O. Uninucleated ascidiospores in *Caeoma nitens*, and associated phenomena. Jour. Agr. Res. 28: 1045-1058. June 7, 1924.

CROWNGALL CAUSED BY BACTERIUM TUMEFACIENS EPS. & TOWN.

Crowngall was reported from New York, New Jersey, Pennsylvania, Delaware, West Virginia, Tennessee, Ohio, Illinois, Michigan, Wisconsin, Iowa, Missouri, Kansas, New Mexico, and Washington. In most cases it was said to be of considerable importance, at least locally. Losses estimated by collaborators were Michigan 10%, Iowa 6%, Kansas 4%, New York, Illinois, New Mexico, and Washington each 1%.

New York: Serious infection local in state. Two patches of seriously infected Columbians noted in Wayne County. (Guba)

Pennsylvania: Heavy losses on introduced plants. Not serious except on plants shipped into state from outside nurseries. Bad cases from Michigan. All varieties appear susceptible. (Krout & Kirby)

Tennessee: Serious, of increasing importance. Most common on St. Regis red raspberry, possibly because this is a more commonly planted variety. (McClintock)

Ohio: Especially general on red varieties. (Wilcox)

Illinois: It is prevalent in all raspberry plantations and in some soils the organism seems to be so abundant as to render raspberry growing impractical. (Anderson)

Michigan: Most important raspberry disease. Cuthbert and Columbians severely injured. (Bennett)

LEAF CURL, MOSAIC, AND STREAK

In some states leafcurl and mosaic are not distinguished. It is believed that further effort should be made along this line.

Leafcurl

Leafcurl was reported from Connecticut, New York, New Jersey, Pennsylvania, Maryland, Ohio, Indiana, Illinois, Michigan, Wisconsin, Minnesota, Iowa, and North Dakota. Losses estimated were: New Jersey 10%, Michigan 1%, Illinois 0.75%.

It is interesting to note that Melchers reported that neither leafcurl nor mosaic was found in Kansas in 1924, although careful inspection was made of large commercial plantations of all varieties in the southern part, and there have been many shipments of plants into the state from sections where these diseases do occur.

Raspberry -- Leafcurl; Mosaic; Streak

New York: Very uncommon. Occasionally found on Cuthbert, never in any great amount. Once collected on Syracuse, a red variety. (Rankin)

New Jersey: Severe on Idaho at New Brunswick. (Dept. Pl. Path.)

Pennsylvania: Chiefly on reds and purples, none on blackcaps. (Krout)

Ohio: Not common on blackcaps but in a few fields, does great damage. Severe on red varieties Cuthbert and Marlboro. Not on King, Herbert, or Ranere. (Wilcox)

Indiana: Rather common in black raspberries, our main commercial crop, and is considered a serious menace to the industry. (Cardner)

Illinois: Leafcurl is especially prevalent on certain varieties of red raspberry; it has caused more trouble in the northern section of the state than elsewhere. (Anderson)

Wisconsin: Fifty-one nurseries report leafcurl and 63 nurseries report yellows. Serious on Cuthbert and Marlboro; these varieties not as much raised as formerly. (Vaughan)

Minnesota: Probably a small percentage in 90% of the fields. (Sect. Pl. Path.)

Mosaic

Mosaic was reported in 1924 from about the same area as leafcurl, and in addition from South Dakota, Colorado, Idaho, and Washington. Losses estimated as due to mosaic were Minnesota 15%, New Jersey and Michigan 10%, Iowa 8%, and Wisconsin 5%.

Rankin has given the following list of varieties found to be susceptible to mosaic in New York:

Red raspberries - Brighton, June Ontario, Brilliant, Kevitt Hybrid, Owasco, Cayuga, King, Perfection, Count, Latham, Redpath, Cuthbert, Loubere, Red Rose, Donboro, Lysterle, Ruby, Eaton (Idaho), Marlative, Segrist, Empire, Marlboro, Seneca, Eureka, Marldon, St. Regis (Ranere), Golden Queen, Miller, Surprise, Goliath, Minnetonka, Superlative, Herbert, Newman.

Purple raspberries - Abundance, Columbian, Haymaker, Royal Purple, Shafer. (From New York State Col. Agr. Depts. Plant Path. & Ent. Weekly News Letter 1924: 25-27. May 5, 1924)

Connecticut: Nursery inspection for this disease taken up for first time this year. Cuthbert worst infected variety. Found also on St. Regis, Herbert, and suspicious symptoms on King and Latham. (Clinton & Hunt)

Raspberry - Leafcurl; Mosaic; Streak

New York: Everywhere but most serious in the Hudson Valley. In Wayne County many plantings of Columbians ruined by mosaic by July. (Guba)

Very common but not an injurious disease. Many black and purple varieties - Columbian (purple) very susceptible. Similar conditions in some red varieties. Certain growing conditions seem to cause this type of mottling also. (Rankin)

New Jersey: Severe on St. Regis, Ontario, Count, June, and Cuthbert. Slight infection on Seneca, La France, Erskine, Park, and Donboro. (Martin)

Pennsylvania: Most important disease of raspberries; everywhere in state. Chiefly on blackcaps; less commonly on purple canes. In rogued fields the disease was reduced to usually less than 1%. (Krout & Kirby)

Ohio: Severe on King, Marlboro; not on Cuthbert or Herbert. On blackcaps, spreading rapidly especially in southern sections of the state. (Wilcox)

Indiana: Noted mainly in red raspberries. These are not grown on a commercial scale. Noted also in the Honey Sweet variety of black raspberry. (Gardner)

Michigan: Low temperatures brought on marked symptoms. (Bennett)

Wisconsin: Noted some beneficial effects from roguing in 1923. Latham resistant as compared to Marlboro. Much confusion between mosaic, mildew and red spider. (Vaughan)

Minnesota: Latham in general shows a very high percentage of mosaic, but one strain showed a small amount. Sunbeam is the only variety generally grown that shows a very low percentage of disease. (Sect. Pl. Path.)

Streak (Eastern bluestem)

Streak was reported from New York, Pennsylvania, Ohio, and Illinois. Anderson states that in Illinois it is primarily a disease of blackcaps, and was especially prevalent in the Bloomington-Peoria district. In New York and Pennsylvania also it occurred on black varieties. Pennsylvania reported a loss of one-half percent.

Literature

Berkeley, G. H. Raspberry mosaic and leaf curl. Canadian Hort. 47: 183. August 1924.

Frank, A. Facts regarding the mosaic disease of raspberry and loganberry in western Washington. Western Washington Sta. Bimo. Bul. 12: 48-51. 1924.

Raspberry - Miscellaneous

Rankin, W. H. Raspberry mosaic and blue stem. New York Agr. Exp. Sta. Circ. 75: March 1924.

Zeller, S. M. Mosaic and other systemic diseases of Brambles in Oregon. Oregon Agr. Exp. Sta. Circ. 49: 15 pp. 1923.

OTHER DISEASES AND INJURIES

Botrytis sp. - In a few fields in Ohio 25% of the fruit was affected (Wilcox). Also reported from New York and Washington.

Cercospora rubi Sacc. - Blotch, Florida.

Cuscuta sp. - Dodder, Wisconsin.

Frost injury - Caused losses of 10% in Ohio, where it was severe in undrained situations (Wilcox), 5% in Iowa, 3% in Minnesota, and 2% in South Dakota. Also reported from Michigan, Wisconsin, Arkansas, Idaho, and Washington.

Gloeosporium sp. (not G. venetum) - Collected by Anna E. Jenkins on Van Fleet raspberry at Bell Station, Maryland. On stem.

Mycosphaerella rubi E. W. Roark (Septoria rubi West.) - Leafspot was reported from New York, New Jersey, South Carolina, Indiana, Illinois, Iowa, and Porto Rico. Losses reported were 3% in Iowa and 1% in Illinois. Most severe on red raspberries, causing serious defoliation in Indiana, according to Gardner.

Septoria rubi pallida Ell. & Holw. was reported on black raspberry from Pennsylvania. "Identified by Dr. L. O. Overholts. Spores too small for S. rubi" (Kirby).

Mycosphaerella rubina (Pk.) Jacz. - Spurbright, Maine (first report), Connecticut, Pennsylvania, Minnesota, North Dakota, Washington. In Minnesota it was quite important, causing a loss of 1.5%, and South Dakota reported 1% loss. Gaba stated that serious damage due to this fungus in one planting in Otsego County, New York, was attributed to lack of pruning and cultivation.

Phragmidium imitans Arth. - Leafrust, Washington.

Pucciniastrum americanum (Farl.) Arth. - In New York this rust was unusually conspicuous by its absence this year. Last year (1923) it was very common at Geneva, causing complete defoliation in many varieties and seedlings. (Rankin)

Sphaerotheca humuli (DC.) Burr. - Powdery mildew, Connecticut (first report, conidia only), New York, Illinois, Minnesota.

Undetermined powdery mildew, probably the same as that reported from Minnesota by Leach and Seal (Phytopath. 14: 61. Jan. 1924), was very important in certain red varieties in New York. Latham and Owasco are the most susceptible varieties, other reds less so but often with 20% infection. Some in black varieties. Causes dwarfed tip of new canes, stops growth in length. Appeared in July and caused greatest damage during August, on new canes about 4 feet high. (Rankin)

The same trouble has been found in Maryland on raspberries, but that it is caused by powdery mildew is questioned and remains to be proved. (Shear & Dodge)

Raspberry - Miscellaneous
Blackberry - Orange rust

Literature

- Anon. Raspberry diseases. Ann. Rep. Dept. Conserv. Indiana 5: 34-37. 1924.
- Anderson, H. W. Raspberry troubles. Amer. Fruit Grow. Mag. 44(7): 4, 9, 11. July 1924.
- Darrow, G. M. Some problems of raspberry growers. Rept. Mass. Fruit Assoc. 30: 147-153. 1924.
- Rahkin, W. H. Raspberry diseases. Proc. New York State Hort. Soc. 69: 139-145. 1924.

BLACKBERRY

ORANGE RUST CAUSED BY *GYMNOCONIA INTERSTITIALIS* (SCHL.) LACH.
AND *KUNKELIA NITENS* (SCHW.) ARTH.

Orange rust reported as *Gymnoconia interstitialis* occurred in Connecticut, on wild species, New York, New Jersey, Delaware, Florida, Mississippi, Texas, Illinois, Wisconsin, and Minnesota. Anderson and Tehon stated that it was extremely important locally in Illinois, and estimated a loss of one-half percent for the state. A specimen of *Tuberoulina persicini* (Ditm.) Sacc., parasitic on the aecia of the rust, was received from New Jersey.

Kunkelia nitens was reported from Maine; Connecticut, on wild vines of *Rubus alleghaniensis*; Pennsylvania, where it was said to be widespread but not generally serious; Virginia, South Carolina and Arkansas on wild blackberry; Indiana as serious locally; Kansas, and St. Maries, Idaho. B. O. Dodge, of the Office of Fruit Disease Investigations, Bureau of Plant Industry, who determined specimens of *Kunkelia nitens* from Maine, stated that they were the first authentic ones as proved by spore germination, from that state.

South Carolina: On wild blackberry. Unimportant, as there are too many such vines. Reduction in yield 20%. (Ludwig)

Arkansas: Very severe on wild canes, reduction in yield from 5 to 10%. All over state. Short-cycled form only one noted in germination tests. (Dept. Pl. Path.)

Orange rust, undetermined, but probably the short-cycled form, was reported from Georgia as locally severe, but generally of slight importance, causing a reduction in yield of 2%.

Reports from West Virginia, Michigan, Ohio, and Iowa did not distinguish between the two species. Porter stated that rust was very important in Iowa, and estimated a reduction in yield of 5%. In both West Virginia and Michigan it was reported to be of considerable importance. Losses estimated in both states were 2%. In Ohio according to Wilcox, it was not serious in Eldorado,

Blackberry - Anthracnose; Miscellaneous

the principal variety grown, but heavy infection of rogues and mixtures occurred.

ANTHRACNOSE CAUSED BY PLECTODISCELLIA VENETA (SPEG.) BURK.

Anthracnose was reported from New York, Pennsylvania, Delaware, West Virginia, Arkansas, Ohio, Illinois, Michigan, Wisconsin, Minnesota, Iowa, Kansas, and Idaho. Losses estimated were: Iowa 3%, Michigan 2%, New York and Illinois each 1%.

New York: Very important locally. More than the usual amount this year. Very severe in many plantings in Yates County. Very prevalent in Chautauqua County with an average of 25% of canes affected in most plantings. Present in all plantings and considerable damage noted in Ontario County. General but of no economic importance in Wayne County. (Guba)

Pennsylvania: Never very important on blackberry and its allies. (Orton)

Illinois: Anthracnose was unusually serious in the early part of the season on blackberry leaves, causing spotting and crinkling due to the abundance of lesions on the veins. Otherwise the disease was about as usual. (Anderson)

Wisconsin: Of minor importance; controlled by spraying with either lime-sulfur or Bordeaux. (Vaughan)

OTHER DISEASES

Armillaria mellea (Vahl) Quel. - Rootrot, Washington.

Bacterium tumefaciens EFS. & Town. - Crown gall, Washington, Texas.

Cercospora sp. - Leafspot, Georgia.

Fusicorporium rubi Wint. - Double blossom, Louisiana

Kuehneola uredinis (Lk.) Arth. - Yellow rust, reported on wild plants and once on cultivated bushes in Connecticut; on wild blackberries in South Carolina.

Leafcurl (undet.) - Only found once in localized area on wild bushes in Center County, Pennsylvania. Has appearance of leafcurl on raspberry. (Orton & Krout)

? Leptothyrium pomi (Mont. & Fr.) Sacc. - Flyspeck resembling this, common on wild bushes at York Springs, Adams County, Pennsylvania. (Kirby)

Mosaic (undet.) - Pennsylvania, "Not important. Trace to 10% found in three localities. One percent found in 200 Eldorado plants in Franklin County; common on wild bushes in Adams County." (Orton & Kirby). Also reported as of slight importance in trucking districts in Iowa. (Porter)

Blackberry - Miscellaneous

Dewberry - Anthracnose; Orange rust; Miscellaneous

- Mycosphaerella rubi E. W. Roark (Septoria rubi West.) - Leafspot, New Jersey, Tennessee, Florida, Texas, Indiana, Iowa, Missouri.
- Sphaerotheca humuli (DC.) Burr. - Powdery mildew, Pennsylvania, Indiana, Gardner reported from the latter state "In a newly planted plot of a number of varieties on the University Horticultural Farm, Mr. E. Stair found a number of plants badly mildewed. Unfortunately, the fungus was not critically examined. This is the first record for Indiana."
- Verticillium albo-atrum Reinke & Berth. - Canker and wilt was local and seemed to do some damage in Minnesota. The fungus was reported as Verticillium sp. This is the first report for the state.

Recent literature (see raspberry)DEWBERRY

ANTHRACNOSE CAUSED BY PLECTODISCELLA VENETA (SPEG.) BURK.

Anthracnose was reported by Fant as causing heavy losses, estimated at 25%, to dewberries in North Carolina. Moore stated that in South Carolina it was severe on all dewberry fields, causing numbers of plants to die and reducing the yield considerably. No preventive measures had been practiced prior to 1924. In Delaware it was very prevalent on the Lucretia variety, according to Adams. The disease was also reported on dewberry from Indiana.

ORANGE RUST CAUSED BY GYMNOCONIA INTERSTITIALIS (SCHL.) LAGH.
AND KUNKELIA NITENS (SCHW.) ARTH.

Gymnoconia interstitialis was reported from New York, Pennsylvania, and Tennessee. In Pennsylvania, according to Kirby and Orton, Kunkelia nitens is common on wild dewberries throughout the state. Dewberry appears to be the most susceptible host. McClintock of Tennessee reported that, "Orange rust was observed only on some wild dewberries. It did not develop on Early Harvest blackberries in a field adjoining the wild dewberries."

The Lucretia dewberry is highly resistant. (Dodge)

OTHER DISEASES

- Kuehneola uredinis (Lk.) Arth. - Yellow rust, Florida.
- ? Leptothyrium pomi (Mont. & Fr.) Sacc. - Sooty blotch resembling that due to this fungus reported from Pennsylvania.
- Mycosphaerella rubi E. W. Roark (Septoria rubi West.) - Leafspot was reported from Pennsylvania, Tennessee, and Indiana.
- Peronospora potentillae D By. - Downy mildew caused by this fungus was reported from Connecticut on wild dewberry. This is the first report received by the Survey.
- Peronospora rubi Rabh. - Downy mildew, reported from Florida on wild plants, completely covering the growing tips and younger leaves

Dewberry - Loganberry - Wineberry - Currant

of new shoots. (Weber). This is the first report to the Survey on this host.

Sphaerotheca humuli (DC.) Burr. - Powdery mildew, Pennsylvania.

LOGANBERRY

The following diseases and injuries of loganberry were reported from Washington: Mosaic, Mycosphaerella rubina (Pk.) Jacz. (spurbright, first report), an undetermined basal rot of the canes, frost and winter injury.

Recent literature

Zeller, S. M. Mosaic disease of the loganberry. (Abstract) Phytopath. 14: 119. 1924.

WINEBERRY

Mosaic (undet.) was reported on wineberry (Rubus phoenicolasius) from Pennsylvania by Orten, who states that this species is apparently quite susceptible.

CURRENT

Leafspot caused by Mycosphaerella grossulariae (Fr.) Lind. caused a loss of 5% in Iowa, according to Porter, and was said to be important locally in New York. It was reported also from Indiana, Illinois, and Minnesota.

Leafspot, Septoria aurea destruens Ell. & Ev. (Mycosphaerella aurea (Ell. & Ev.) R. E. Stone), was said to be severe locally at Ames, Iowa, by B. N. Uppal.

Anthraxnose, Pseudopeziza ribis Kleb., was reported from Connecticut, New Jersey, New York, Ohio, and Indiana. In New Jersey it caused a loss of 10%, according to Martin, who stated that in the southern part of the state many plantings were completely defoliated before the crop was harvested. The disease was important in Ohio and Indiana also.

Caneblight due to Botryosphaeria ribis Gross. & Dug. was reported from Ohio only. Stevens and Jenkins, in a recently published article (6), state that this fungus has been found and proved to be parasitic on rose and horsechestnut. They report that the disease is now known to occur in Massachusetts, Connecticut, New York, Ohio, Pennsylvania, New Jersey, Maryland, and Virginia.

Leafspot, Cercospora angulata Wint., caused a loss of 7% in Iowa according to Porter, and was reported as of slight importance in Indiana.

Rootrot, Fomes ribis (Schum.) Fr., was observed about the crown of a few plants at the Geneva Experiment Station, New York, but was causing no injury. (Guba)

Sooty mold, Fumago vagans Pers. A specimen of this fungus on red currant was received from Washington.

Currant - Gooseberry

Canker, Nectria distissima Tul. New York, Minnesota.
Physalospora cydoniae Arn. (P. malorum (Berk.) Shear) was found to be fruiting, producing the perfect stage, on dead currant canes. (5).
Rust, Puccinia grossulariae (Schum.) Lagh. New York, Minnesota, North Dakota.

Recent literature

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2. Lees, A. H. Progress report on big bud and reversion of black currants. Jour. Bath. & West. & South. Co. Soc. Agr. V, 18: 195-198. 1924.
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4. Shear, C. L., Neil E. Stevens, and Marguerite S. Wilcox. Botryosphaeria and Physalospora on currant and apple. Jour. Agr. Res. 28: 589-598. May 10, 1924.
5. Stevens, Neil E. Physalospora malorum on currant. Jour. Agr. Res. 28: 583-588. May 10, 1924.
6. ————— and Anna E. Jenkins. Occurrence of the cane blight fungus on other hosts. Jour. Agr. Res. 27: 837-844. March 15, 1924.
7. Vasil'evskii, N. I. Zur Biologie Septoria ribis Desm. auf Ribes nigrum. Bolezni Rast. 13: 12-21. 1924.
 Russian with German resumé.

GOOSEBERRY

Dieback, Botrytis sp., is reported from Washington. (1).
Leptosphaeria coniothyrium (Fekl.) Sacc. A specimen of the Coniothyrium stage was received from Indiana, where it was said not to be particularly serious. This is the first report on this host from Indiana.
Leafspot, Mycosphaerella grossulariae (Fr.) Lind., was reported from New York, Indiana, and Illinois. Gardner stated that it was very serious in Indiana, much more so on gooseberry than on currant. According to Tehon, it was more abundant in Illinois in 1924, whereas in the preceding year it was not prevalent in the southern tip.

Anthraxnose, Pseudopeziza ribis Kleb., was reported as important in New Jersey, Delaware, Indiana, and Illinois. Martin estimated a loss of 5% in New Jersey, and stated that many plants were completely defoliated. Adams reported that in Delaware "Heavy infection caused early defoliation." The dis-

Gooseberry - Mulberry - Cranberry

ease was very serious in Indiana and caused premature defoliation, according to Gardner. Tehon stated that anthracnose was locally serious in Illinois and reported a loss of 0.75%.

Rust, Puccinia grossulariae (Schum.) Lagh., was reported from New York, Pennsylvania, Wisconsin, Iowa, and North Dakota. In most cases it was not important, but Guba reported that in one planting in Ulster County, New York, there was a loss of 30% or more, due to rust infection of the foliage, young shoots, and fruits, and Porter reported a loss of 2% for Iowa.

Powdery mildew due to Sphaerotheca mors-uvae (Schw.) Berk. & Curt. was reported from New York, Minnesota, and Washington. Guba stated that in New York,

"Mildew was reported only from the Hudson Valley. In Ulster County it was controlled with a single application of copper spray or dust or sulfur spray or dust. On June 28 check rows in the demonstration showed nearly 100% foliage infection."

Recent literature

1. Heald, F. D., and B. F. Dana. Notes on plant diseases in Washington - 1. Dotrytis diseases. Trans. Amer. Microscop. Soc. 43: 136-144. July 1924.
2. Maarschalk, H. Control of American gooseberry mildew by alkaline Bergundy mixture. Rept. Int. Conf. Phytopath. & Econ. Entom. Holland 1923: 119-120. 1923.

MULBERRY

Bacterial spot, Bacterium mori (Doyler & C. R. Lambert) emend. EFS. - Indiana, caused angular black leaf lesions and dieback of twigs (Dietz).

Blotch, Cercospora moricola Cke., caused complete defoliation of several trees at Fort Pierce, Florida (Weber).

Rootrot, Ozonium omnivorum Shear, was prevalent in the black lands of Texas, where it caused a loss of 2%. (Taubenhaus)

Phyllosticta moricola Ell. & Ev., Missouri (specimen received, determined by E. A. Seigler and W. W. Diehl)

Popcorn disease, Sclerotinia carunculoides E. A. Seigler & A. E. Jenkins - During the year specimens were received by the Office of Pathological Collections from Texas, Georgia, and Louisiana. The disease had not been reported previously from the latter state. (Jenkins)

CRANBERRY

Red leafspot, caused by Exobasidium vaccinii (Fekl.) Wor. C. G. Malde stated that this disease was more serious than ever before in one locality in Wisconsin, and permits for the sale of the plants were refused. In Pacific County, Washington, it was the most important fungous disease of

Cranberry

the host, attacking the berries and young wood as well as the leaves, according to the Department of Plant Pathology.

False blossom (undet.) was reported as less important than usual in Wisconsin. Surprising improvement was noticed in individual fields, according to Malde.

The following diseases and injuries were reported from Pacific County, Washington: (*= first report from this state **= first report from any state to the Survey):

- *Acanthorhynchus vaccinii Shear, causing fruitrot.
- Bordeaux injury causing deforming of blossoms and poor set of fruit.
- **Botrytis sp. causing blossom rot (may be but weakly parasitic).
- Stevens (7) reports this disease as common in Washington and Oregon.
- Botrytis sp. causing fruitrot (5).
- *Cepthospora lunata Shear, blackrot.
- *Exobasidium oxycocci Rostr., roseblom.
- Fusicoccum putrefaciens Shear, endrot.
- Penicillium sp., fruitrot.
- **Phomopsis sp., storage rot.
- Sclerotinia oxycocci Wer., hardrot (cotton ball fungus), causing tip-blight and field rot.
- Sporonema oxycocci Shear, fruitrot in storage.

Recent literature

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2. ————— Report of the cranberry substation. Proc. Amer. Cranberry Grow. Assoc. 54: 18-21. 1924.
3. ————— Cranberry disease work in New Jersey. Proc. Amer. Cranberry Grow. Assoc. 55: 11. 1925.
4. Franklin, H. J. False blossom In his State bog report for 1922 and 1923. Ann. Rept. Cape Cod Cranberry Grow. Assoc. 1923-24: 7-8. 1924.
5. Heald, F. D., and B. F. Dana. Notes on plant diseases in Washington - 1. Botrytis diseases. Trans. Amer. Microscop. Soc. 43: 136-144. July 1924.
6. Stevens, Neil E. Notes on cranberry fungi in Massachusetts. Phytopath. 14: 101-107. 1924.
7. ————— Notes on blueberry and cranberry diseases. Proc. Amer. Cranberry Grow. Assoc. 55: 7, 10. 1925.

BLUEBERRY AND HUCKLEBERRY

Rust caused by Pucciniastrum myrtilli (Schum.) Arth. was found on huckleberry at Caldwell, Chester County, Pennsylvania. The alternate stage was found on Tsuga canadensis at the same place. (Orton)

Dodder, Cuscuta sp. - Pennsylvania, on low blueberry; the first report of dodder on this host received by the Survey.

Exobasidium vaccinii (Fckl.) Wcr. - Galls caused by this fungus were collected in Florida on Gaylussacia frondosa and G. baccata (Weber).

Dryrot, due to Sclerotinia vaccinii-corymbosi J. M. Reade was found in one patch of blueberries in Elkhart County, Indiana. This is the first report of this disease to the Survey. Specimens were received and the determination verified by Shear.

Stevens (1) makes the following statement concerning the distribution and importance of Sclerotinia rot of blueberries:

"The most destructive disease of blueberries, so far observed, is the Sclerotinia rot. This rot is readily distinguished by the fact that the fungus completely fills the cavity of the berry with the result that the berry becomes hard and dry - true mummy. Sclerotinia rot is found to some extent on many species of wild blueberries in the New England States. For some reason not fully understood it has been very destructive on the experimental blueberry plantation at East Wareham, Massachusetts. In 1921 the loss from this disease was variously estimated at from one-fourth to one-third the crop. In 1922-1923 practically the entire crop was killed by Sclerotinia. This year conditions were much more favorable and the loss amounted to only about one-tenth of the crop. Miss White and Mr. Hutton informed me that this disease proved serious at Whitesbog (New Jersey) during 1921 and have suggested that the unusual infection was associated with unusual weather conditions.

"This disease furnishes another example of the close relation between blueberry and cranberry disease, for Sclerotinia rot, caused by a species very close to, if not identical with, the one on blueberries is a very common rot on cranberries in Washington and Oregon."

Other diseases mentioned by Stevens are:

Botrytis sp., causing blossom blight, observed on one or two varieties at Whitesbog, New Jersey, in all cases on bushes which seemed to have had insufficient drainage.

Calypsotheca sp., witches' broom rust, on high-bush and low-bush blueberries and mountain cranberry. As far as known this disease does not occur south of Massachusetts.

Phomopsis sp. causing twigblight, very closely related to if not identical with the fungus commonly causing rot of cranberries after picking, has proved serious in the experimental planting at East Wareham, Massachusetts, and a few cases were found at Toms River and at Whitesbog, New Jersey. The bushes looked as though they were winter killed, but isolation and inoculation proved the causal relation of the Phomopsis.

Blueberry and Huckleberry; Dingleberry; Citrus fruits

Recent literature

1. Stevens, Neil E. Notes on blueberry and cranberry diseases. Proc. Amer. Cranberry Grow. Assoc. 55: 7, 10. 1925.

DINGLEBERRY

Tarspot, Rhytisma vaccinii Fr. Generally abundant wherever found on dingleberry (Vaccinium stamineum) in Pennsylvania. (Orton)

DISEASES OF SUB-TROPICAL FRUITS

Prepared by H. R. Fulton

CITRUS FRUITS

MELANOSE CAUSED BY PHOMOPSIS CITRI FAWC.

Florida: Young foliage and fruit in some groves were badly affected in the spring. The disease is worse in groves where there is considerable deadwood in the trees. It has been demonstrated that spraying with 3-3-50 Bordeaux mixture plus 1% oil soon after the petals have dropped controls this disease. (Burger)

Prevalence much less than the average, but of major importance. First noted infections were in January. The greatest injury was produced during wet periods in March and June, April and May being too dry for general infection. Grapefruit is more susceptible than orange. Spraying with Bordeaux-oil in April satisfactorily protected the young fruit. (Winston)

Alabama: More prevalent than usual but unimportant. (Miles)
More than usual, but of minor importance. (Winston)

Mississippi: Prevalence about the same as usual; unimportant; first noted in May. (Neal)

Louisiana: Present, but not important. (Edgerton)

Texas: Occasionally observed in Cameron and Hidalgo Counties, but not in sufficient amount to justify special control measures. (Winston)

Arizona: None reported. (Streets)

Citrus fruits - Stemend rot; Scab

Porto Rico: Common, but not serious. (Cook)

STEMEND ROT CAUSED BY PHOMOPSIS CITRI FAWC.

AND DIPLODIA NATALENSIS EV.

Florida: Causes more loss than any other disease. Usually shows up during transportation during the fall months. (Burger)

Affects oranges and grapefruit about equally. More prevalent than usual throughout the state. Spraying for melanose control and the use of a borax bath in the packing house generally satisfactory. (Winston)

Mississippi: Slightly more than usual; important locally; first report in October. (Neal)

Louisiana: Not reported, probably present. (Edgerton)

Arizona: None reported. (Streets)

California: Considerable Diplodia stemend rot in lemons in southern California. Phomopsis californica Fawcett caused some rot of mature lemons in storage in southern California during the summer; more than the preceding year. (Fawcett)

Porto Rico: Diplodia stemend rot was common. (Cook)

SCAB CAUSED BY SPHACELOMA FAWCETTI A. E. JENKINS

(formerly erroneously attributed to
CLADOSPORIUM CITRI (PRO TEM) MASSEE)

Florida: Was very prevalent in all sections in the spring on the new growth; caused many grapefruits to be classed as culls. (Burger)

More prevalent than usual. First infection noted in January. Greatest injury during cool rainy weather in early spring and again during summer rains. Very few growers sprayed for control because of low prices for grapefruit. (Winston)

Alabama: Less than usual. (Miles)

Less than usual on satsuma oranges; mostly leaf infection; freezes killed most of the bearing wood, and very little fruit set; consequently little or no spraying for scab control. (Winston)

Mississippi: Less than usual but becoming important in many satsuma groves. Present in about 75% of the groves, causing a reduction in yield of about 1%. The season was unusually dry, and this was unfavorable for scab development. (Neal)

Louisiana: Considerable on satsuma orange. (Edgerton)

Citrus Fruits - Scab; Citrus canker

Texas: Of major importance on rough lemon and sour orange nursery stock in Cameron and Hidalgo Counties. No treatment given. Occurred in minor degree on bearing grapefruit, not serious enough to justify special control measures. (Winston)

Arizona: None reported. (Streets)

Porto Rico: Very severe. (Cook)

Literature

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Describe fungus as Sporotrichum citri Butler
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4. Peltier, G. L. and W. J. Frederick. Relation of environmental factors to citrus scab caused by Cladosporium citri Massee. Jour. Agr. Res. 28: 2410254. April 19, 1924.

CITRUS CANKER CAUSED BY BACTERIUM CITRI (HASSE) JEHLE

Florida: No cases found during 1924. (Report of Department of Citrus Canker Eradication, Florida State Plant Board for December 31, 1924)

Alabama: Reported once; trees destroyed. (Miles)

Mississippi: No cases found. (Neal)

Louisiana: Usual amount in southern part of the state. First reported infection in June. (Edgerton)

Probably effectively eradicated east of the Mississippi River where commercial plantings are found. In the south central and southwestern parishes infection ranges from light to very heavy, mostly in yard trees. (W. E. Anderson)

Texas: No record. (Taubenhaus)

Literature:

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2. ——— Citrus canker eradication (South Africa). Union South Africa Dept. Agr. Jour. 6: 65. 1924.

Citrus Fruits - Citrus canker; Blue mold rot; Blackrot

3. Halstead, E. W. No citrus canker in valley. Valley Farm and Citrus Grow. 1(12): 16, 22. Feb. 1924.
4. Peltier, G. L. Further studies on the relative susceptibility to citrus canker of different species and hybrids of the genus Citrus, including wild relatives. Jour. Agr. Res. 28: 227-239. April 19, 1924.

BLUE MOLD ROT CAUSED BY *PENICILLIUM DIGITATUM* (FR.) SAOC.
AND *P. ITALICUM* WEH.

Florida: Causes a great deal of decay during transit; when fruits are handled with care there is but little loss. (Burger)
Considerable loss, but less than usual, caused mostly by *Penicillium digitatum*. Borax bath in packing houses, with care in handling, control successfully. (Fulton)

California: Considerable loss from both types of *Penicillium* rot. (Fawcett)

Literature

1. Fulton, H. R. and J. J. Bewman. Preliminary results with the borax treatment of citrus fruits for the prevention of blue mold rot. Jour. Agr. Res. 28: 961-968. May 31, 1924.
2. ————— and J. R. Winston. Controlling blue mold rot of citrus fruits with borax solution. Florida Grower 30(18): 7. Nov. 1, 1924.

BLACKROT CAUSED BY *ALTERNARIA CITRI* PIERCE

Florida: Little of this disease present, not nearly as prevalent as the year before. (Burger)

About the same as usual; of minor importance; first recorded appearance in October; greatest injury during the fall. (Winston)

California: On navel oranges from all sections; not of great importance. An interior rot of mature lemons caused by *Alternaria* is very serious during the summer months. (Fawcett)

Literature

1. Bartholomew, E. T. *Alternaria* rot of lemons. (Abstract) Phytopath. 14: 120. Feb. 1924.
2. ————— *Alternaria* rot of lemons. California Citrogr. 8: 262, 293-294. June 1923.

Citrus Fruits - Anthracnose and Withertip; Lime Withertip; Footrot

ANTHRACNOSE AND WITHERTIP ATTRIBUTED TO *COLLETOTRICHUM GLOEOSPORIOIDES* PENZ.

Florida: Withertip showed up in a virulent form on the West Coast this past winter; specimens from various localities show it to be quite common and widespread. (Burger)

Alabama: Withertip much more than usual, in about 80% of the plantings, following severe freeze injury. (Miles)

Mississippi: Withertip general, but important only in neglected groves. (Neal)

Louisiana: Anthracnose present but not important. (Edgerton)

Texas: Trace of anthracnose. (Taubenhaus)

Arizona: None reported. (Streets)

California: Anthracnose fairly important on mature fruits of orange and lemon. Withertip severe in one locality on Mediterranean Sweet Oranges. (Fawcett)

Porto Rico: Withertip not important except in neglected groves. (Cock)

LIME WITHERTIP CAUSED BY *GLOEOSPORIUM LIMETTICOLUM* CLAUSEN

Florida: Worse than usual, developing on young fruit during rains just after blooming period. West Indian and Thornless Dominican varieties very susceptible. First report in January. (Winston)

Literature

1. Stell, F. Withertip of limes in Dominica. Proc. Agr. Soc. Trinidad and Tobago 24: 181-185. April-May 1924.

FOOTROT ATTRIBUTED TO *PHYTOPHTHORA TERRESTRIS* SHERB.

Florida: Rather common in sweet seedling orange groves on low, poorly drained lands. A common way of combatting this disease is by inarching with resistant sour orange seedlings. (Burger)

Somewhat less prevalent than usual, but of major importance in old seedling orange groves throughout the citrus belt. Removal of soil from larger roots so as to allow aeration arrests the disease. (Winston)

Texas: Decay of bark at crown resulting in death of tree was very prevalent in groves of oranges and grapefruit of all ages in Cameron County. (Winston)

Citrus Fruits - Miscellaneous

MISCELLANEOUS DISEASES, PARASITES KNOWN OR SUSPECTED

Blast and Blackpit caused by Bacterium citrarefaciens H. A. Lee was reported by Fawcett as being unimportant in California. The blackpit effect on fruit was more prevalent on lemons than oranges. The blast of leaves and twigs affected oranges in the northern citrus region of the state. Infection occurred from January to April.

Brownrot caused by Pythiacevstis citrophthora E. H. Smith & R. E. Smith was less prevalent than usual in California because of deficiency in winter and spring rains. Lemons are most susceptible, oranges and grapefruit less so. Control is secured by spraying the ground and lower branches with Bordeaux and by washing the fruit in hot (115° to 120°F) water. (Fawcett)

Cottony rot caused by Sclerotinia sclerotiorum (Lib.) Mass. was less prevalent than usual in California; lemons and occasionally oranges were injured in winter and spring. (Fawcett)

Damping-off caused by Rhizoctonia sp. did considerable damage in many nursery seedbeds in Florida. (Burger)

Felt fungus girdle caused by Septobasidium pedicellatum (Schw.) Pat. was reported by Burger from all portions of Florida.

Flyspeck caused by Leptothyrium pomi (Mont. & Fr.) Sacc. was reported by Burger from the East Coast of Florida where it did no damage but disfigured the fruit.

Fungal leafspot attributed to Alternaria sp. was reported from Arizona. Leaves developed small red to salmon colored spots with chlorotic margins. When cultured in the laboratory these gave an Alternaria, probably Alternaria citri. Removal of fallen leaves, fruits, and dead wood, followed by a thorough spraying with a good fungicide and practiced for several seasons should control the disease. (J. G. Brown)

Grey mold rot caused by Botrytis cinerea Pers. was not of great importance in California. Mature fruit of lemons and oranges were affected in winter and spring. (Fawcett)

Gummosis caused by Diplodia sp. resulted in death of bark on trunk or limbs of lemon, orange, and other citrus in California. (Fawcett)

Gummosis caused by Botrytis cinerea Pers. was rather slight in California. It occurred on the older trees in the spring, mainly in the coast regions. Lemons are most susceptible, followed by oranges and grapefruit. (Fawcett)

Gummosis and twilight caused by Sclerotinia sclerotiorum (Lib.) Mass. occurred in California during winter and spring on trunks, large roots and twigs of lemon and orange. (Fawcett)

Gummosis caused by Pythiacevstis citrophthora E. H. Smith & R. E. Smith was less prevalent than usual in California, but occurred in over 90% of the citrus plantings in the state and caused considerable damage in some. Gummosis and death of bark on trunk and large roots at the crown was produced on trees of all ages. Lemon, orange, grapefruit, rough lemon, sour orange, and other citrus forms were affected. There is much less in recent years on account of preventive methods being used or recommended. (Fawcett)

Algal disease caused by Cephaleuros virescens. Kunze was reported by Cook as occurring commonly on citrus in Porto Rico.

Rootrot caused by Armillaria mellea (Vahl) Quel. was of usual prevalence on all varieties of citrus in California, causing death of roots in certain localities especially where oaks or sycamores have been. (Fawcett)

Citrus Fruits - Miscellaneous

Scaly bark attributed to Cladosporium herbarum citricolum Fawc. was quite prevalent in Florida. In some sections the disease was very virulent while in some of the older sections it caused practically no commercial losses. (Burger)

Shellbark caused by Phomopsis californica Fawc. was of usual prevalence in California. It was found on lemon only and was important in some orchards, especially in southern California, causing death of the outer layers of bark. (Fawcett)

Shoestring fungus disease caused by a fungus similar in gross characters to Corticium stevensii (Noack) Burt. was slightly more prevalent than usual in Florida but of minor importance. It was confined to a few spots in the Everglades, and developed during the summer rainy season causing defoliation and death of twigs and surface discolorations of fruit. Grapefruit was more susceptible than orange. Bordeaux-oil applied in late spring checks the disease for a year. (Winston)

Sooty mold caused by Capnodium citricolum was common in Florida. (Fulton), and Porto Rico (Cook). A trace was reported from Texas (Taubenhaus).

Sour rot caused by Oospora citri-aurantii (Ferr.) Sacc. & Syd. was reported by Burger from two places in Florida on lemons. Fawcett reported a considerable amount on mature lemon and orange fruit in California during the summer.

MISCELLANEOUS DISEASES, CAUSE UNKNOWN OR NON-PARASITIC

Chlorosis (Frenching, Mottle leaf), cause undetermined, was reported from Florida by Burger and Winston; from Alabama and Texas by Winston; from Arizona by Streets, and from California by Fawcett. Burger attributes it in some cases to liming the soil. Winston reports it as most prevalent whereshell or limestone is found in quantity in the soil; that oranges are more susceptible than grapefruit; and that humus in the form of stable manure or cover crops corrects the trouble. Fawcett reports that organic nitrogenous fertilizers like stable manure appear to help in some soils.

Dieback (Exanthema, Fruit Ammoniation) was more prevalent than usual in Florida; oranges are more susceptible than grapefruit; Bordeaux sprayed on the trees in the spring, or bluestone applied to the soil usually corrects the trouble. (Winston)

Burger reported from Florida an unusual development of brown, gumming areas in the rind of young grapefruit which was regarded as a form of ammoniation; and the usual amount of typical dieback. Incipient stages of dieback in the form of multiple buds and practically defoliated twigs were reported by Winston from Texas. J. G. Brown reported similar symptoms from Arizona. Fawcett reports the disease as scattered here and there, but important in California.

Frost injury. The most disastrous freeze of many years occurred in January throughout the satsuma orange belt from northern Florida to Louisiana. Burger reports considerable damage to the satsuma industry in northwestern Florida. Miles reports that all citrus trees in Alabama were injured, varying in degree from slight to complete killing, with practically no fruit production for the season. Injury was least where correct cultural practices had been followed and trees had been kept free from diseases and insect pests. Winston reported satsuma orange trees in Alabama with 10% to 100% of the bearing wood

Citrus Fruits - Miscellaneous

killed and in many instances large limbs were killed back to the trunk or the trees were killed outright; trees that had borne no fruit or light crops the previous year and that had been kept free from scale insects the whole of the preceding season were injured least. Edgerton reported very severe injury in new satsuma plantings in southern Louisiana caused by temperatures of 12° to 16°F in January. Taubenhauß reported no observed frost injury in Texas, and Horne reported severe injury in late December on unpicked fruit in the Sacramento district of California. Streets reported a trace from Arizona.

Greasy spot (Black melanose), cause unknown, was reported by Burger as being common in Florida and by Cook as being abundant in Porto Rico.

Greenspot, caused by exuded oil preventing proper coloring up of green rind following mechanical injury. Burger reports much trouble during the early part of the shipping season in Florida.

Gummosis, (including Psorosis) caused undetermined, was reported by Burger as doing much damage in Florida. Winston reports the usual prevalence in Florida during spring and summer; painting twice a year with soda, lye, and bluestone mixture often is effective. Cook reported it as common but not destructive in Porto Rico. Fawcett reports that Psorosis is becoming slowly more important in California and is coextensive with orange orchards, affecting from 1% to 30% of the trees: the scraping method of treatment gives good results.

Lightning injury was reported by Burger as quite common in Florida.

Peteca, cause unknown, was about the same as usual on California lemons. (Fawcett)

Spray injury was reported by Burger as being due in Florida to oil and to lime sulphur sprays.

Wilt, cause unknown, was reported by Burger as being serious on the East Coast of Florida, and in some of the older groves in the northern part of the citrus belt.

Recent literature on various citrus diseases

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Citrus Fruits - Literature

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Citrus Fruits - Avocado; Banana

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AVOCADO

Algal leafspot caused by *Cephaleuros virescens* Kunze was common but seldom serious on shaded leaves in Florida. (Weber)

Anthracoase caused by *Colletotrichum gloeosporioides* Penz. was destructive on young fruit and succulent new growth in Florida. (Weber) Cook reported fruit rot, caused by *Gloeosporium* sp. as common in Porto Rico.

Blotch caused by *Cercospora* sp. was reported as unimportant on nursery stock in Florida. (Weber)

Footrot caused by *Diplodia* sp. caused some loss in Florida in nursery stock and in new field plantings. (Weber)

Leafspot caused by *Pestalotzia guapini* Desm. var. *vaccinii* Shear was widespread and severe in Florida; the leaves were spotted and the edges curled. (Weber) A trace was reported from Texas by Taubenhaus.

Powdery mildew caused by *Oidium* sp. was quite prevalent in Florida during the rainy season. (Weber).

Scab caused by *Sphaeceloma fawcettii* Jenkins (formerly erroneously attributed to *Cladosporium citri* (Mass.) was widespread and sometimes caused serious defoliation in Florida (Weber). Winston reports more than the usual amount in Florida, beginning in February and affecting young fruit and tender leaves.

Recent literature

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BANANA

Anthracoase caused by *Gloeosporium misarum* Oke. & Mass. was widespread on the Cavendish banana in Florida attacking the leaves and the ripened fruit. (Weber). It was common in Porto Rico (Cook).

Banana: Cherimoya: Date: Fig

Bacterial disease caused by Bacterium musae (?) resulted in killing of the leaf tissue in black areas advancing from margins to the midrib of the Cavendish banana in Florida. (Weber)

Rootknot caused by Heterodera radicum (Greef) Muell. caused a partial wilting of Cavendish banana plants in one locality in Florida. (Weber)

Wilt caused by Fusarium cubense EPS. was common in Porto Rico. (Cook)

Recent literature

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CHERIMOYA

Anthraxnose attributed to Colletotrichum gloeosporioides Penz. was found attacking the fruit and causing a definite rot in one locality in Florida (Weber)

DATE

Leafspots, caused in one case by Exosporium palmivorum Sacc. and in the other by Alternaria sp. were reported from Florida. (Weber)

Rust caused by Graphiola phoenicis (Moug.) Poit. was reported from Porto Rico by Cook.

FIG

Anthraxnose caused by Glomerella cingulata (Ston.) Spauld. & Schrenk was general but of minor importance in Georgia (Foyd) and in Mississippi (Neal and Wallace).

Cankers of four types were reported as follows: (1) caused by Diplodia sycina Mont. var. sycanophila Sacc. was reported by Taubenhaus from Texas; (2)

Fig: Guava: Loquat

caused by Macrorhonia fici Alm. & Cam. was reported by Taubenhaus from Texas; (3) caused by Sclotbasidium pedicellatum (Schw.) Pat. was rather general in Mississippi, but of moderate importance (Neal); (4) caused by Tubercularia fici Edg. affected over 20% of the trees in Georgia and reduced the yield about 10%; it was common in old plantings and sometimes completely killed the trees (Doyd); also reported near Norfolk, Princess Anne County, Virginia, (Fromme).

Leafblight caused by Rhizoctonia microsclerotia Matz was very destructive on leaves, small twigs and young fruit in Florida. (Weber)

Leafspot caused by Cercospora fici Heald & Wolf, C. bolleana (Thum.) Sacc., or Cercospora sp. was reported as unimportant in Georgia, Mississippi, and Texas.

Link blight caused by Corticium lactum Karst. was of usual prevalence throughout southern Georgia causing slight loss in yield. (Doyd)

Rootknot caused by Heterodera radicum (Greef) Muell. was prevalent in Texas but caused little loss. (Taubenhaus)

Rootrot caused by Ozonium omnivorum Shear was prevalent in the black lands of Texas. (Taubenhaus)

Rust caused by Phytophthora fici (Cast.) Arth. was reported by Weber as the most serious disease of figs in Florida. In Georgia Doyd reported premature defoliation generally too late in summer to cause appreciable loss. Taubenhaus reported it as unimportant in Texas.

Softrot attributed to Aspergillus sp. and Rhizopus sp. was general in Georgia reducing the yield 10%. (Doyd)

Soured fruit, cause undetermined, was quite prevalent in Texas. (Taubenhaus)

Recent literature

- Heald, F. D. and E. F. Dana. Notes on plant diseases in Washington. I. Botrytis diseases. Trans. Amer. Microscop. Soc. 43: 136-144. July 1924.

GUAVA

Fruitrot caused by Glomerella psidii (Del.) Sheldon was very severe in Porto Rico. (Cook)

LOQUAT

Anthraxnose caused by Colletotrichum sp. was well distributed in Florida producing a sort of withertip on young shoots and fruit spurs. (Weber)

Leafspot caused by Phyllosticta sp. was reported as causing leaf shedding in one locality in Florida. (Weber)

MANGO

Anthracose attributed to Colletotrichum gloeosporioides Penz. was wide spread and destructive in Florida; attacking fruit and young twigs causing both to drop off. (Weber). Cook reports a severe fruit rot and canker in Porto Rico attributed to Gloeosporium sp. G. O. Ocfemia reports the collection of Gloeosporium sp. in a mango nursery in the Philippines.

Internal fruitspot, cause unknown, was reported from one locality in Florida; the outer skin was intact, but slightly sunken in small areas; underneath the flesh was tougher and lighter colored than surrounding parts; later this area formed a sort of cyst being hollow in the center. (Weber)

Scab attributed to Cladosporium sp. was not plentiful in Florida but was severe in some places. (Weber)

PAPAYA

Fruitrot caused by Gloeosporium cingulata (Ston.) Spauld. & Schrenk was reported as serious in one locality in Porto Rico. (Nolla)

Leafspot caused by Pucciniopsis carica Earle was reported from one locality in Florida. (Weber)

PERSIMMON

Anthracose caused by Gloeosporium diospyri Ell. & Ev. caused considerable twigblight and dying back of new growth in Florida. (Weber)

Crowngall caused by Bacterium tumefaciens EFS. & Town. resulted in the death of considerable nursery stock and newly set trees in Florida. (Weber)

Footrot caused by Diplodia sp. killed many trees especially in young plantings in Florida. (Weber)

Leafspot caused by Pestalozzia guepini Desm. was common in Florida. (Weber)

Leafspot caused by Cercospora sp. was of minor importance in Georgia. (Doyd)

Softrot caused by Rhizopus sp. caused much loss during wet weather in Texas; infection occurred on maturing fruit through wounds made by a large stink bug. (Taubenhaus)

Scab caused by Cladosporium sp. was reported from one locality in Florida. (Weber)

PINEAPPLE

Fruitrot caused by Thielaviopsis paradoxa (de Seynes) Hoehn. occasioned heavy losses in shipping from Porto Rico. (Cook) G. O. Ocfemia reported from the Philippines a Thielaviopsis rot and a brownrot, the cause of which was not determined.

Wilt, cause unknown, gave considerable trouble in Florida. (Weber)

Pomegranate: Pecan

POMEGRANATE

Fruitrot caused by Gloeosporium sp. was reported from Porto Rico. (Kolla)

Rootknot caused by Heterodera radicicola (Greef) Muell. was reported from one locality in Mississippi. (Barker)

DISEASES OF NUTSPECAN

SCAB CAUSED BY FUSICLADIUM EFFUSUM WINT.

Scab was reported from South Carolina, Georgia, Florida, Mississippi, and Texas. Losses estimated were 20% in South Carolina and 5% in Georgia.

Georgia: Less than last year; less rain during critical period.

Delmas, Georgia, Alley, Schley, Pabst, Mobile, and Success most susceptible in the order named. Sanitary measures followed with four to six applications of Bordeaux mixture recommended. (Demaree)

Florida: Scab was prevalent wherever the host is grown and was severe on nuts, young twigs, and leaves. (Weber)

Mississippi: Less than usual or than last year, very dry this year. Confined largely to Delta and Coastal sections, although becoming general in prevalence. Pabst, Delmas, Schley, and Success are susceptible in the order named. Stuart, Van Deman, Frotscher, and Money Maker are resistant; controlled largely by Bordeaux spray. (Neal & Wallace)

Texas: Unimportant, due to dry weather(?). (Taubenhaus)

Recent literature

Demaree, J. D. Some lessons learned in reference to control of the pecan scab. Proc. Nat. Pecan Grow. Assoc. 22: 29-36. 1923.

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Neal, D. C., O. M. Chance, R. P. Barnhart, and E. K. Dymun. Spraying experiments for pecan scab control in Mississippi in 1923. Mississippi Agr. Exp. Sta. Circ. 53: 1-4. July 1924.

Pecan - Brown leafspot; Miscellaneous

BROWN LEAFSPOT CAUSED BY *CERCOSIORA FUSCA* (HEALD & WOLF)
EMEND. F. V. RAND

Brown leafspot caused loss reported at 1% in Texas and one-half percent in Georgia, and was also reported from Mississippi.

Georgia: Of minor importance except on trees lacking vigor. All varieties seem to be equally susceptible. Fertilization, cultivation, or any factor increasing vigor of trees tends to reduce disease. July and August spraying with any good fungicide will prevent infection. (Demaree).

OTHER DISEASES AND INJURIES

Bacterium tumefaciens EFS. & Town. - Crown gall was relatively unimportant in Mississippi. (Neal)

Blacknit (nonpar.) - Caused a loss of 2% in Georgia. Frotscher is possibly most susceptible; no difference noted in other varieties. No effective treatment known. (Demaree)

Cephalothecium roseum Cda. - Pinkrot following scab, South Carolina.

Glomerella cingulata (Ston.) Spauld. & Schrenk - Anthracnose was important locally in Mississippi; common on Stuart, Delmas, Pabst, and Van Deman (Neal & Wallace). Demaree reported it from Georgia.

Kernel spot (insect puncture) - South Carolina.

Microsphaera alni (Wallr.) Wint. - Powdery mildew, general, unimportant in South Carolina. (Ludwig)

Oidium sp. - Powdery mildew, Texas.

Ozonium omni vorum Shear - Traces. Pecan is apparently highly resistant to this rootrot. (Taubenhaus)

Phyllosticta caryae Pk. - Nursery blight caused a loss of 5% in Georgia. Individual seedlings show differences in susceptibility. Remedy: spray with 3-3-50 Bordeaux during April, May, and June. (Demaree) Also reported from Florida.

Rosette (undet.) - Caused a loss of 5% in Georgia. No varietal difference in susceptibility noted. Treatment: increase organic content of the soil, applications of stable manure are most effective. (Demaree) Also reported from Texas.

Winter injury - Death of young trees due to low temperatures during January, 1924, was reported from Georgia and Alabama. In Georgia trees under 8 years old were affected, especially those 3 and 4 years old. In Alabama the trees killed were from 1 to 5 years old, and those most severely attacked were especially thrifty and vigorous, growing late into the winter. Demaree stated that withholding fertilization and cultivation during the latter half of the season, and wrapping the trunks of the trees with cloth will help to prevent winter injury.

Walnut: Coconut - Budrot

ENGLISH WALNUT

Canker caused by Sphaeropsis sp. was reported from Connecticut by Clinton.

COCONUT

BUDROT CAUSED BY PHYTOPHTHORA FABERI MAUB.

What seems to be the true budrot of coconut, at first attributed to Bacillus coli Esch. then to Pythium and later to Phytophthora has now been determined as occurring in Florida. In January of 1924 one of the assistant nursery inspectors of the Florida State Plant Board noted a diseased condition in a block of coconut palms near Miami and submitted specimens to the plant pathologist at Gainesville. After examination of these and numerous other samples Phytophthora faberi was isolated and further investigation with that organism is now in progress, conducted by J. L. Seal of the Florida Station. A general survey of coconut palms on the east coast of Florida is being conducted and up to the present time several hundred, including seedlings and young trees, have been destroyed on account of the disease. The prospects for preventing the spread of budrot and eventually stamping it out seem good.

Recently C. M. Tucker (1) reported that budrot has appeared in epidemic form on the west coast of Porto Rico. More than 800 cases have been recorded between Mayaguez and Rincon. Mr. Tucker thinks high precipitation during certain months of the year is an important factor in the development of epidemics. He has isolated Phytophthora faberi and succeeded in infecting mature palms with that organism. Eradication of diseased palms has been found efficacious in reducing the incidence of the disease in an experimental grove in Porto Rico.

Recent literature

Cited:

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Not cited:

Gadd, C. H. Phytophthora faberi Maub. Ann. Roy. Bot. Gard. Peradeniya 9: 47-89. June 1924.

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Sundararaman, S. Bud-rot of coconuts caused by Phytophthora palmivora. Agr. Jour. India 19: 84-85. Jan. 1925.

Tucker, C. M. La pudricion del cogollo del cocotero en Puerto Rico. Rev. Agr. Puerto Rico 12: 385-390. June 1924.

OTHER DISEASES AND INJURIES

Rootrot, Thielaviopsis paradoxa (De Seyn.) Hoehn., was said by Cook to be common in Porto Rico. In Florida it was found to be the cause of the killing of a large number of seedlings soon after sprouting. It was not common but was serious where it occurred. (Weber)

The following diseases were reported by Weber from Florida. None of them have been reported to the Survey previously.

Alternaria sp., leafspot.

Colletotrichum sp. caused considerable spotting of the leaves and often a deep rotting of the leaf petioles, causing them to break down.
Common.

Cytospora palmarum Cke. observed on leaves and petioles; not important.

Diplodia epicocos Cke. was found commonly, causing the leaf petioles to become weak and break down, often a serious condition.

Fusarium sp., dry rot, was noticed on many specimens sent in to the laboratory. The fungus was almost invariably present on all killed parts, often secondary.

Gloeosporium ranoti Prill. & Del., anthracnose, causing numerous small spots on the leaves.

Pestalozzia palmarum Cke., leafspot, almost as well distributed as the host plant, but damage very small.

Ramularia sp., causing leafspot, not important.

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